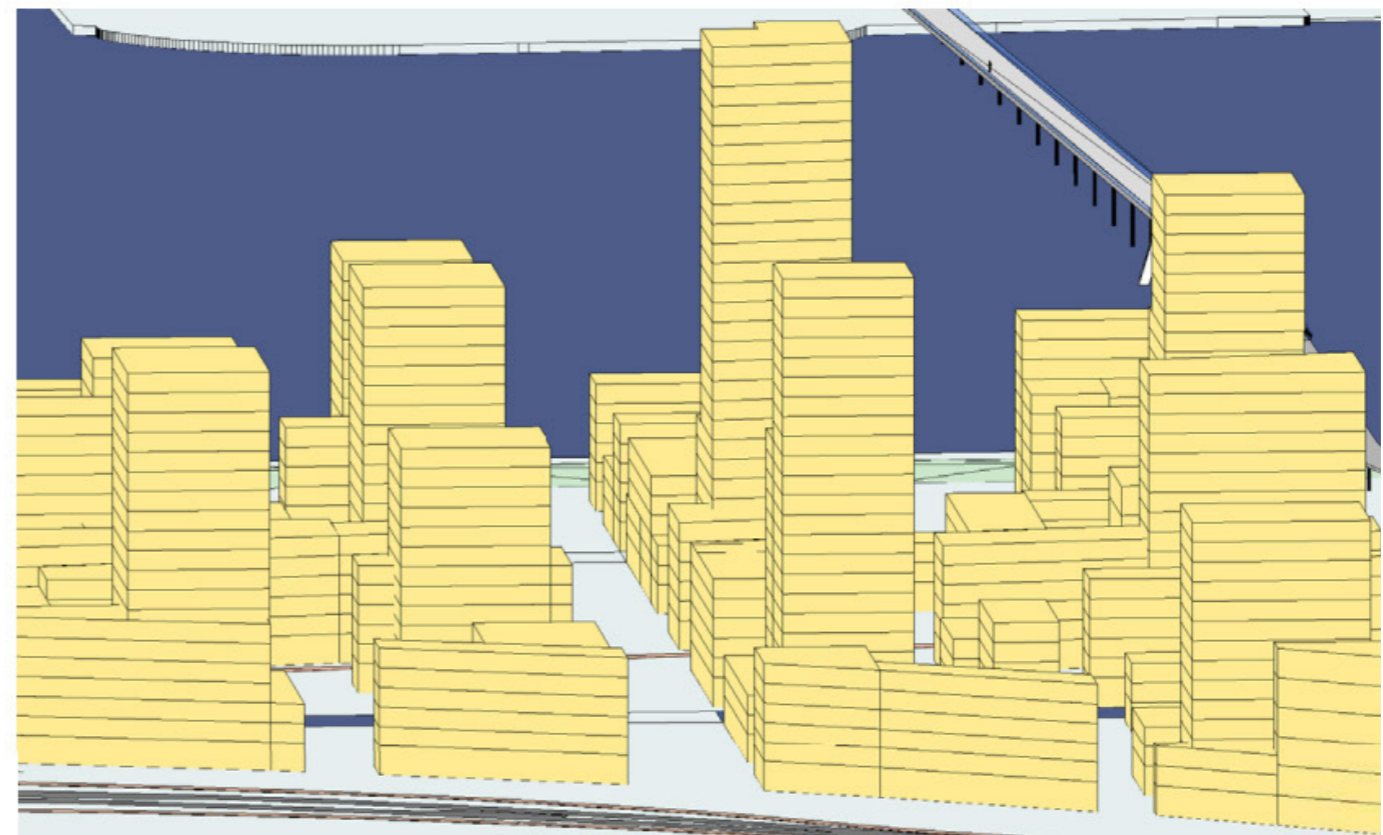
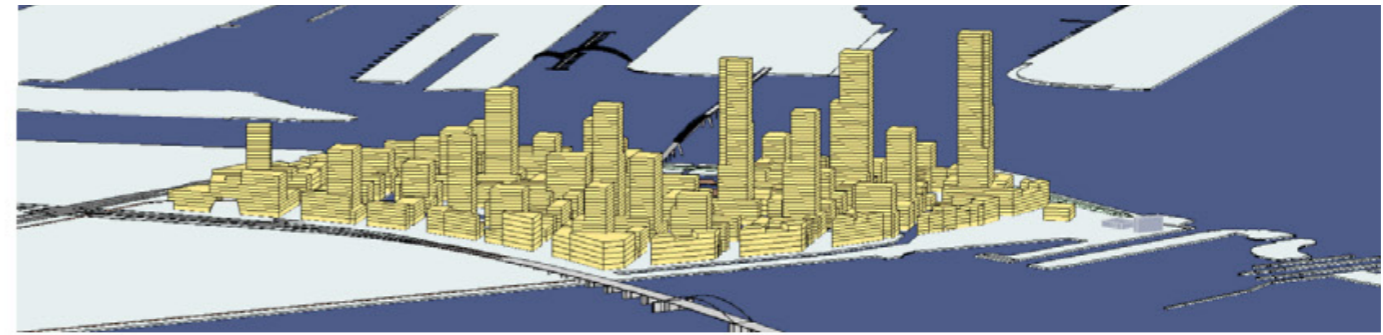
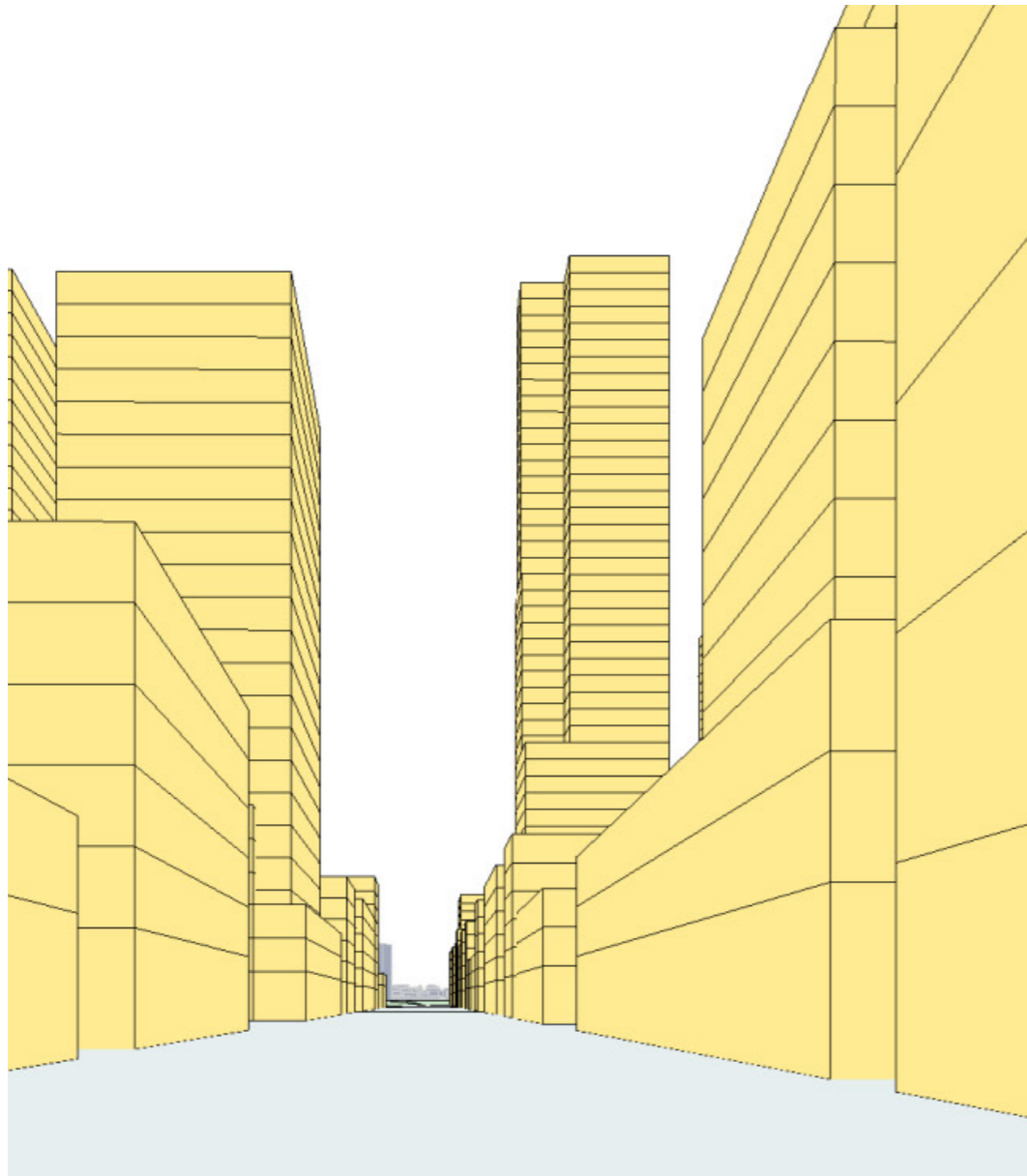


COMPLEX. a cathedral for living.



architectural engineering
1 million homes
15 december 2022

berend vos



buildings are spatially and structurally 2D.

St. Mary's Church in Gdansk (1502)



Grundtvig's Church in Copenhagen (1940)



structure and space seem to have become more dull over time.

what have we forgotten?

G Residence by LP Architectur

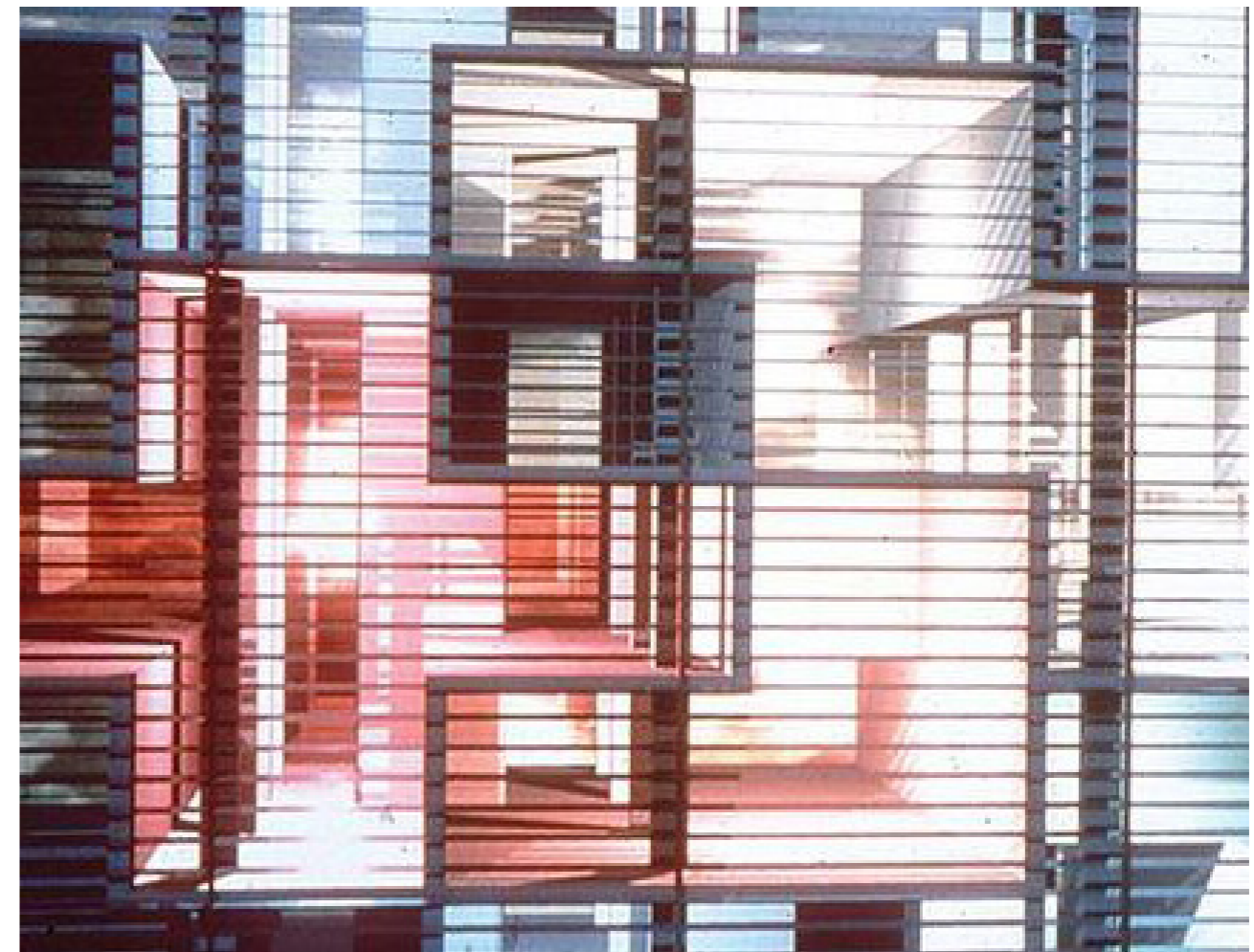
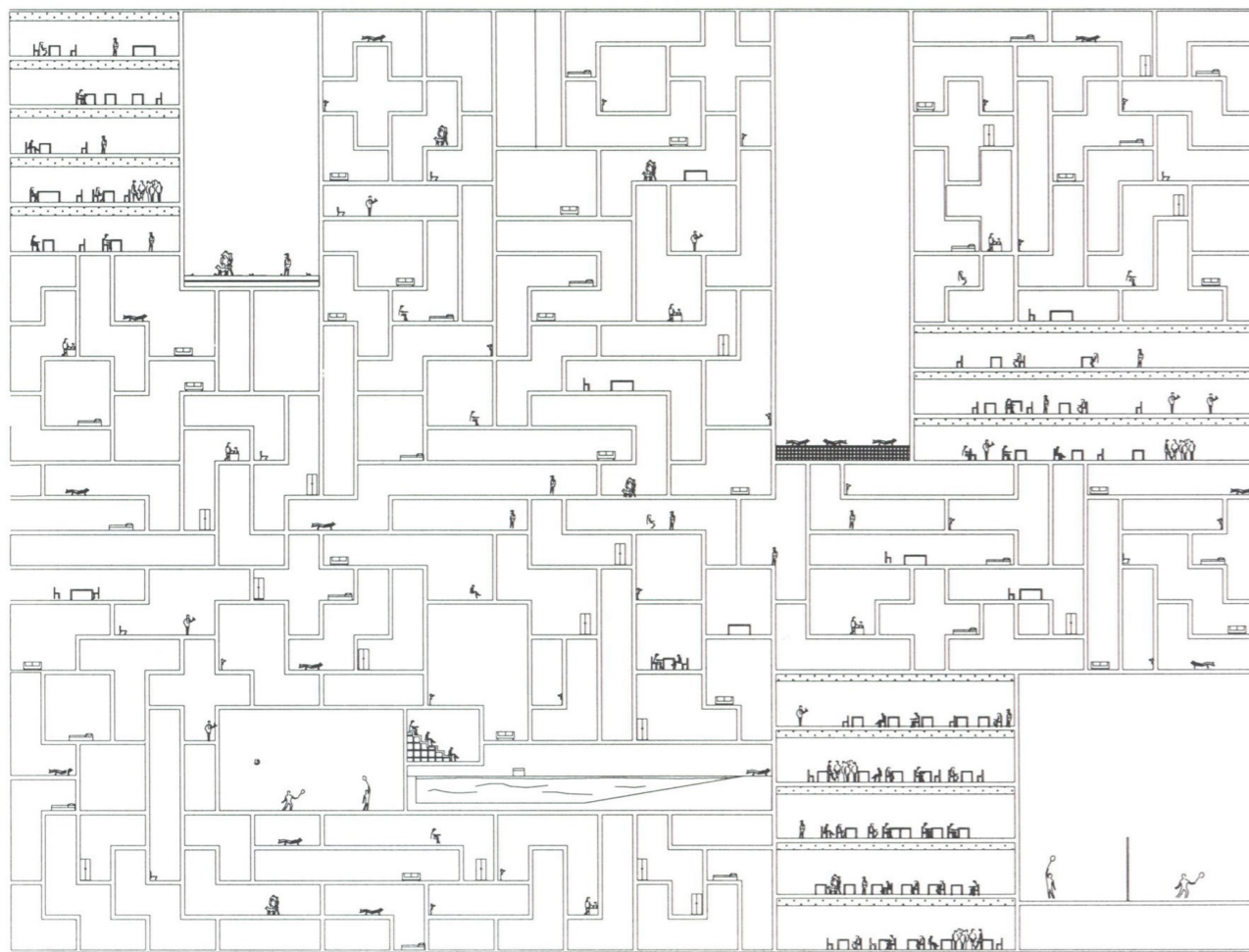


Mapungubwe Interpretation Centre by Peter Rich Architects



can't we live in something better than a box?

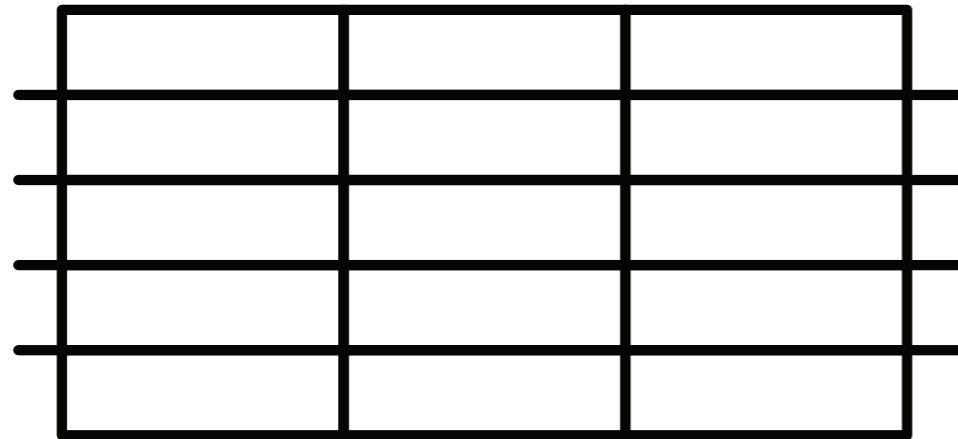
sure we can....



spatial: mass customized housing, the typology puzzle.



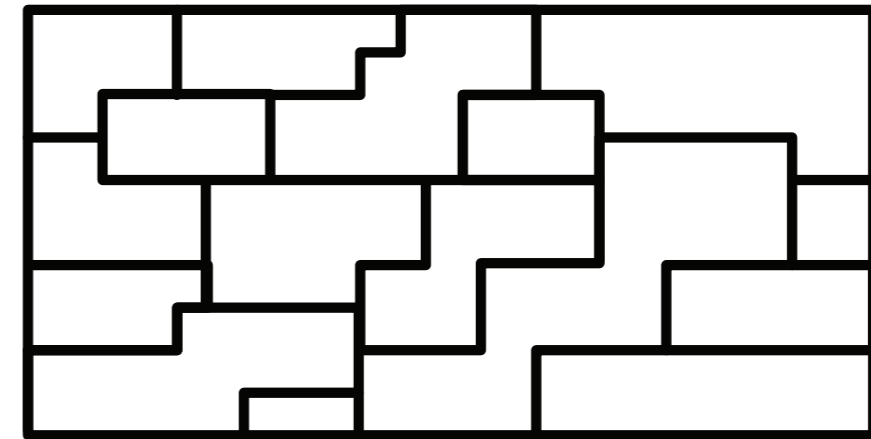
structurally: funicular structures, in 2d the arch, in 3d the vault



from living in stacked boxes



to



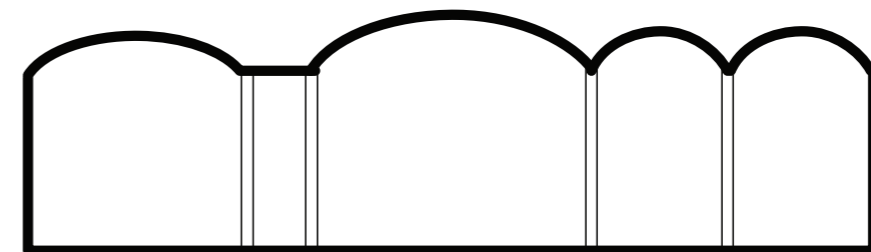
3-dimensional housing typologies



from a hidden unexpressive structure

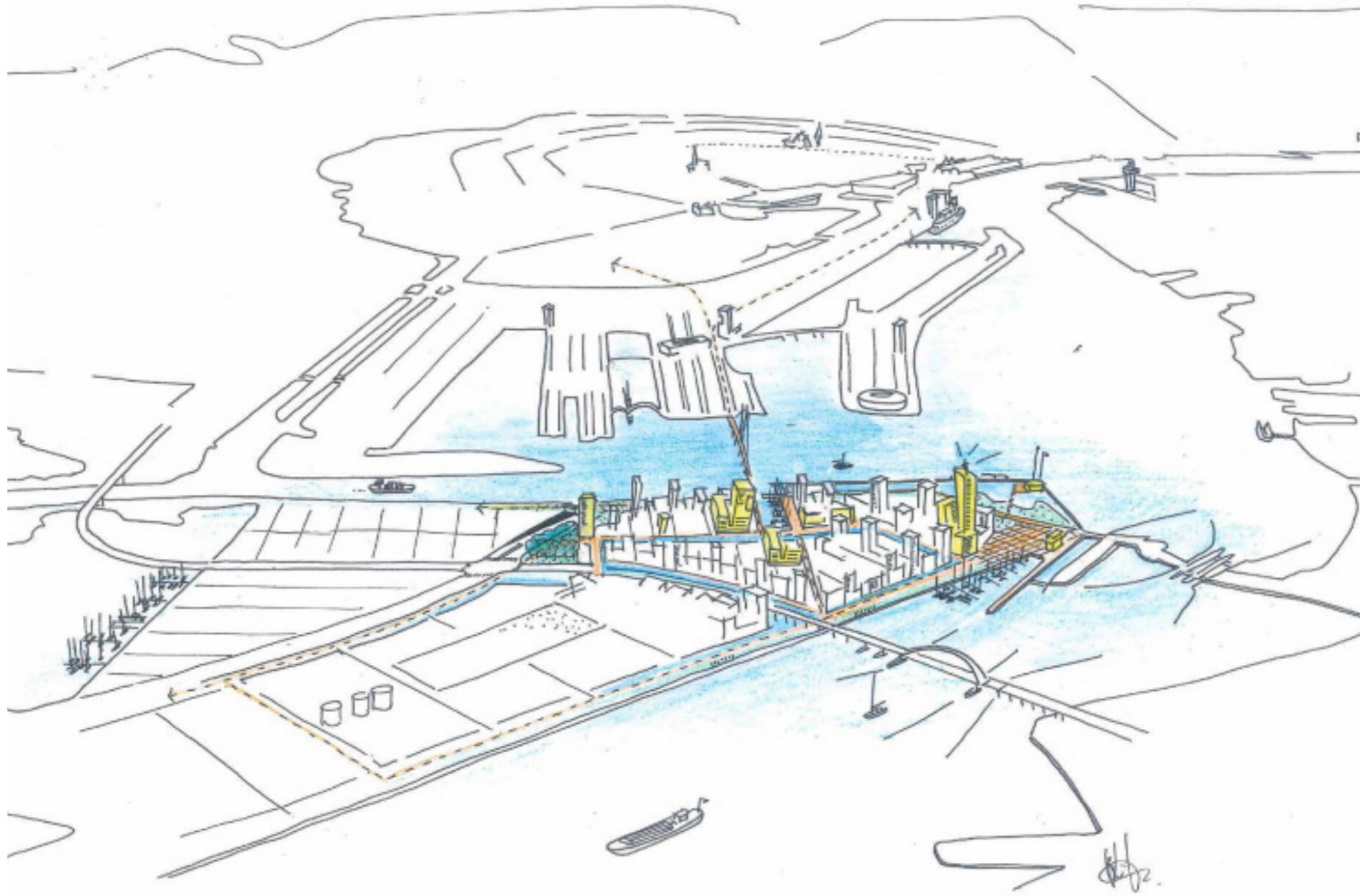


to



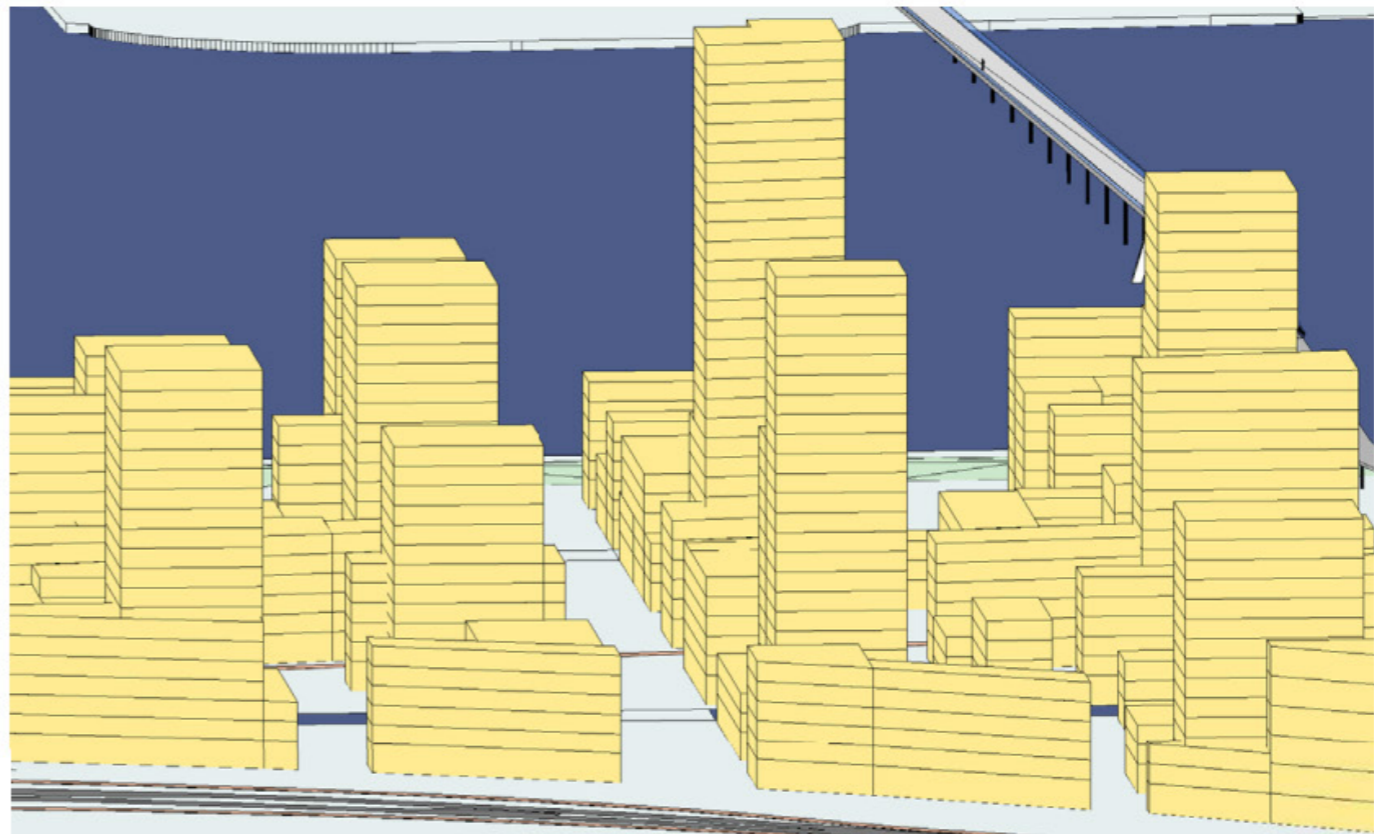
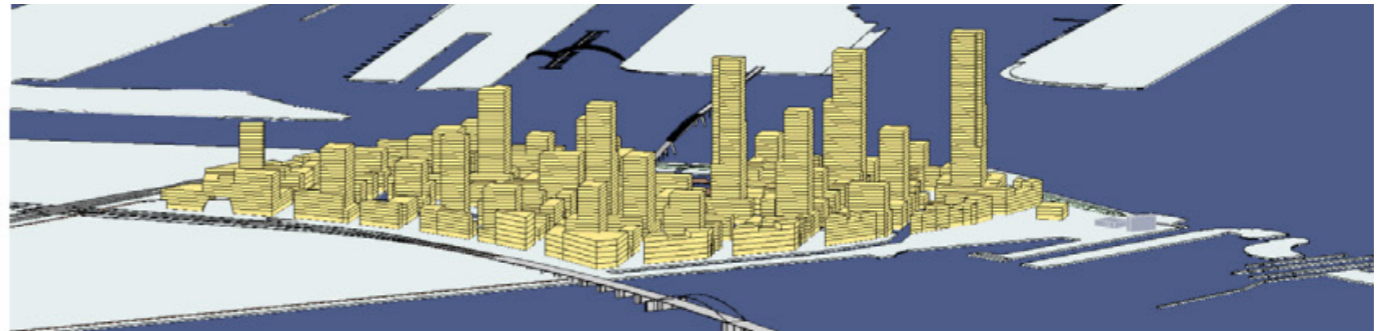
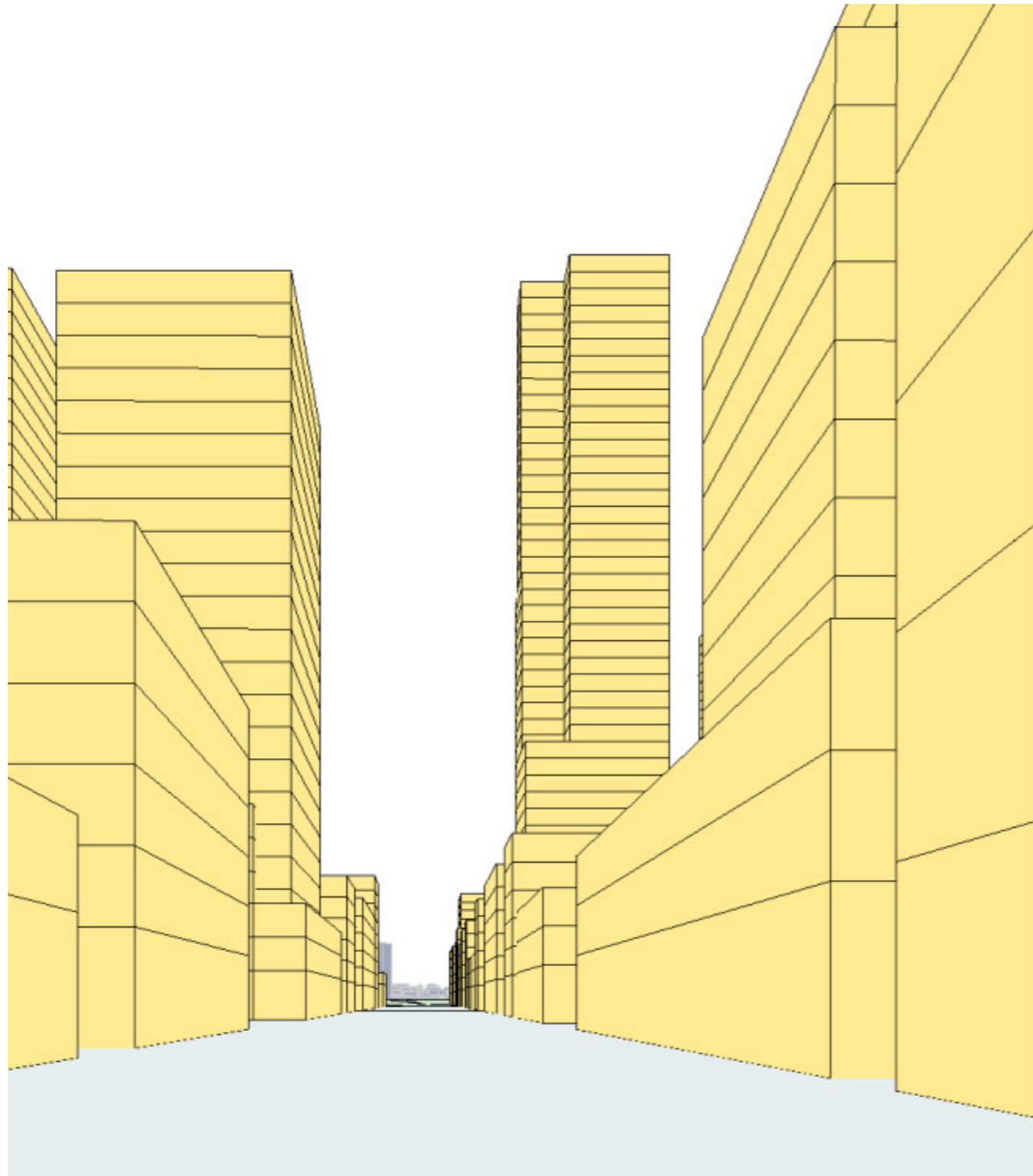
a structure related to the spaces

Gemeente Amsterdam (2017)

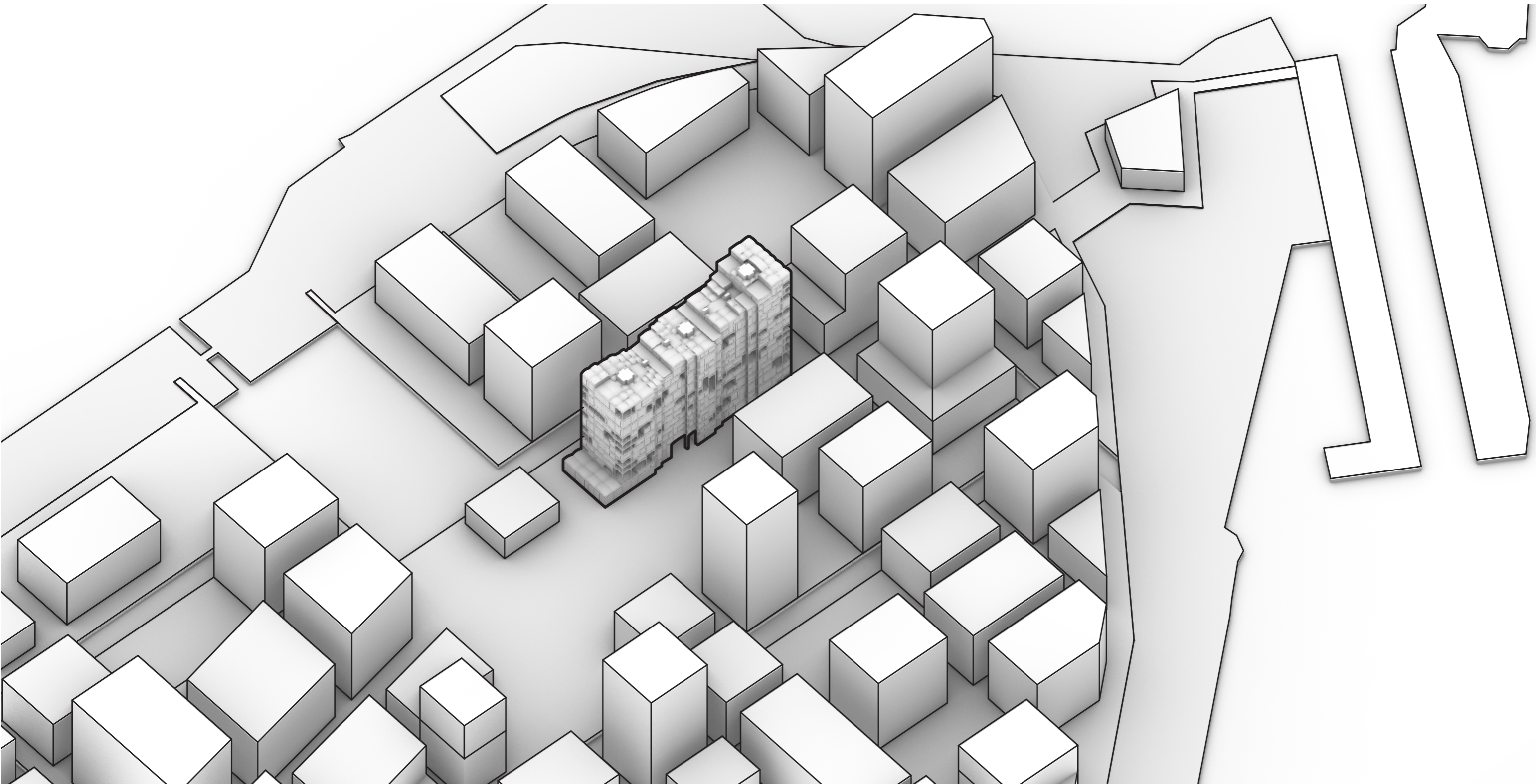


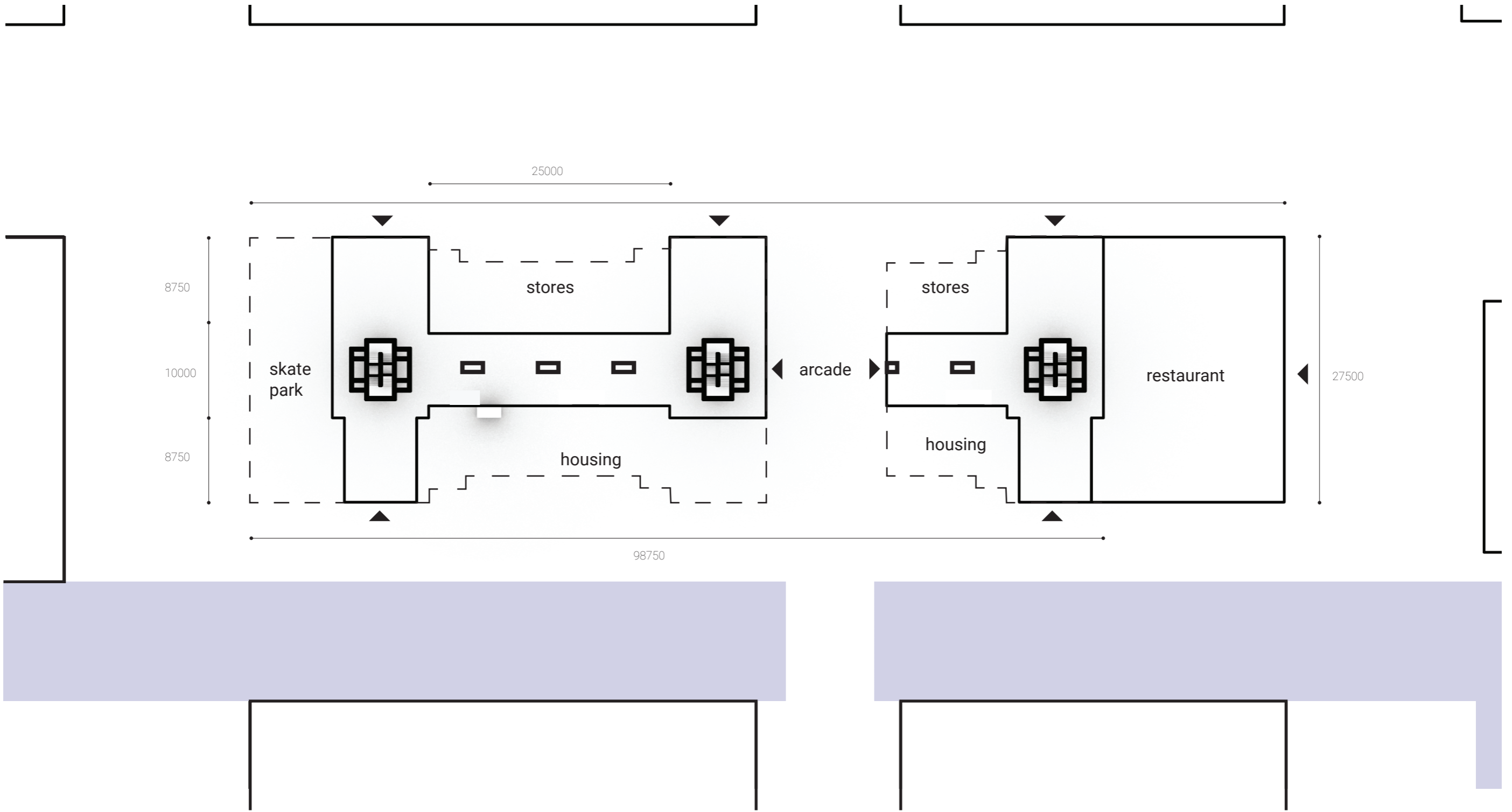
the sluisbuurt in amsterdam

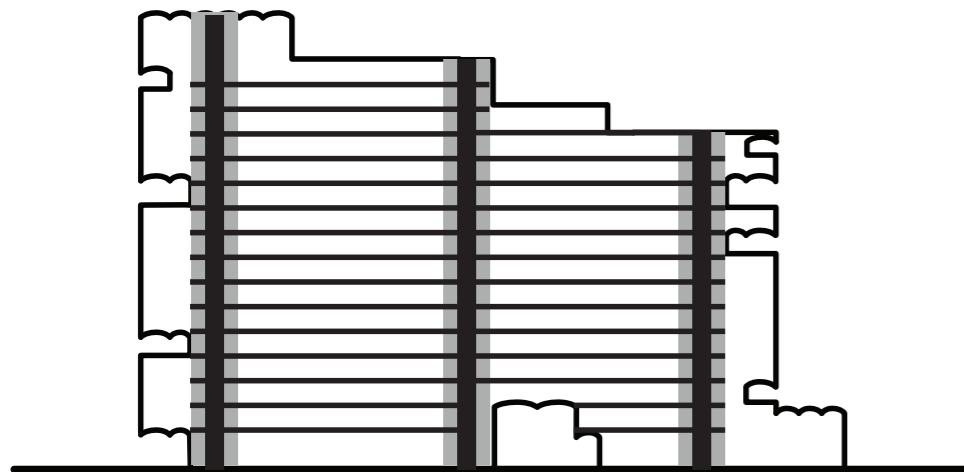
Gemeente Amsterdam (2017)



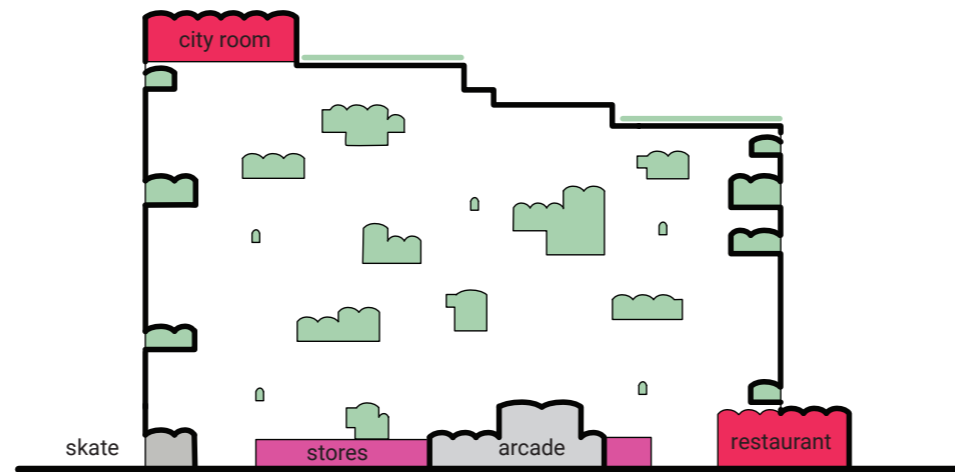
a manifestation of the housing crisis.



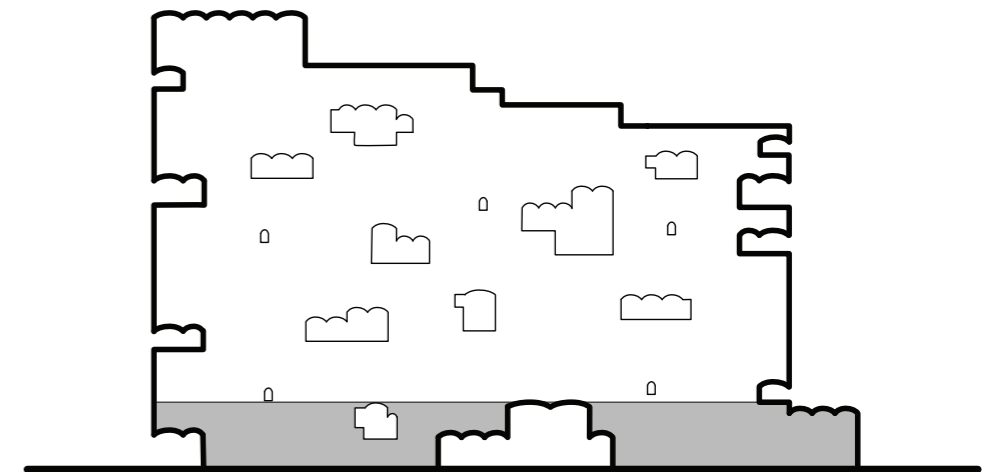




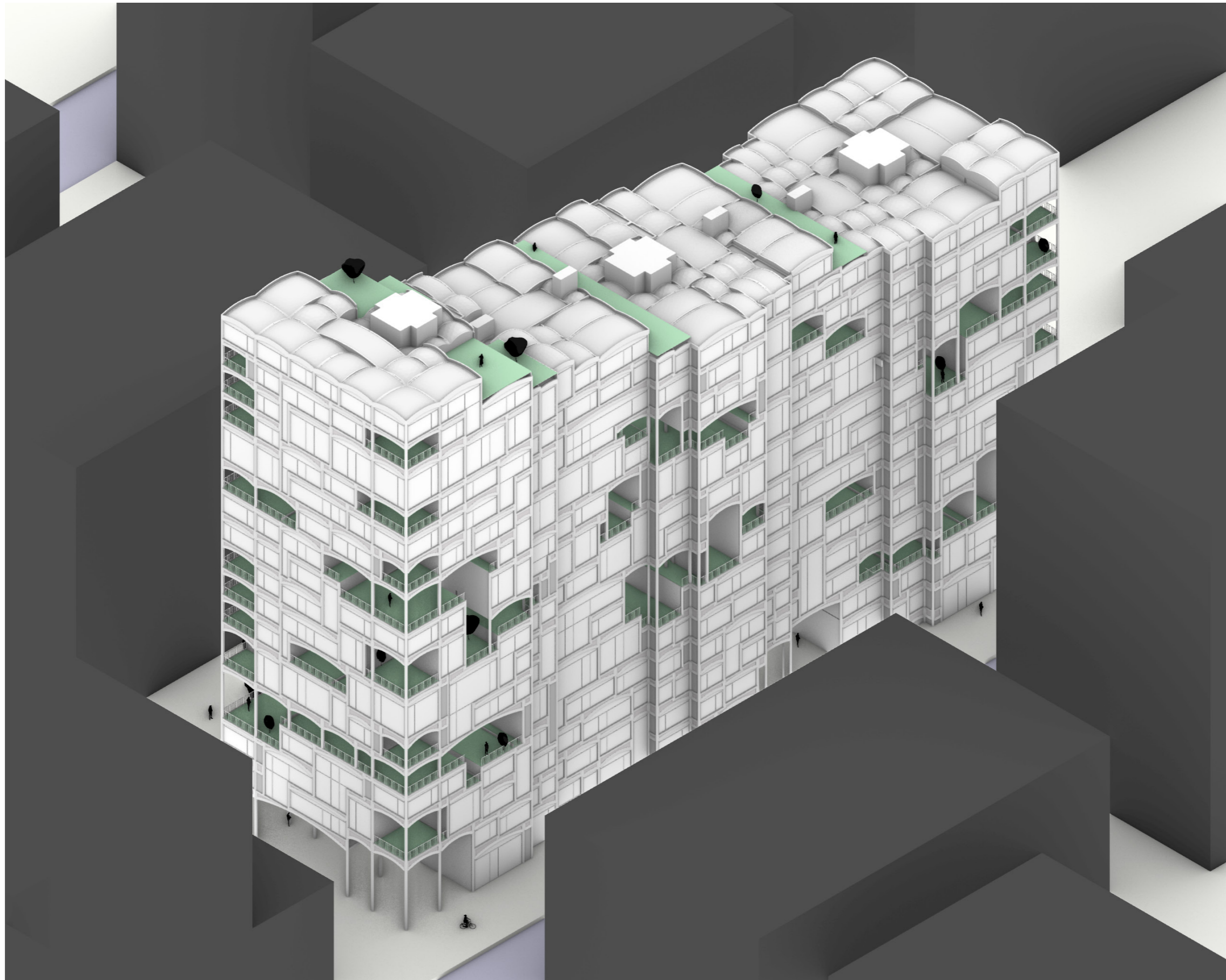
homes are reached through three cores connected by corridors

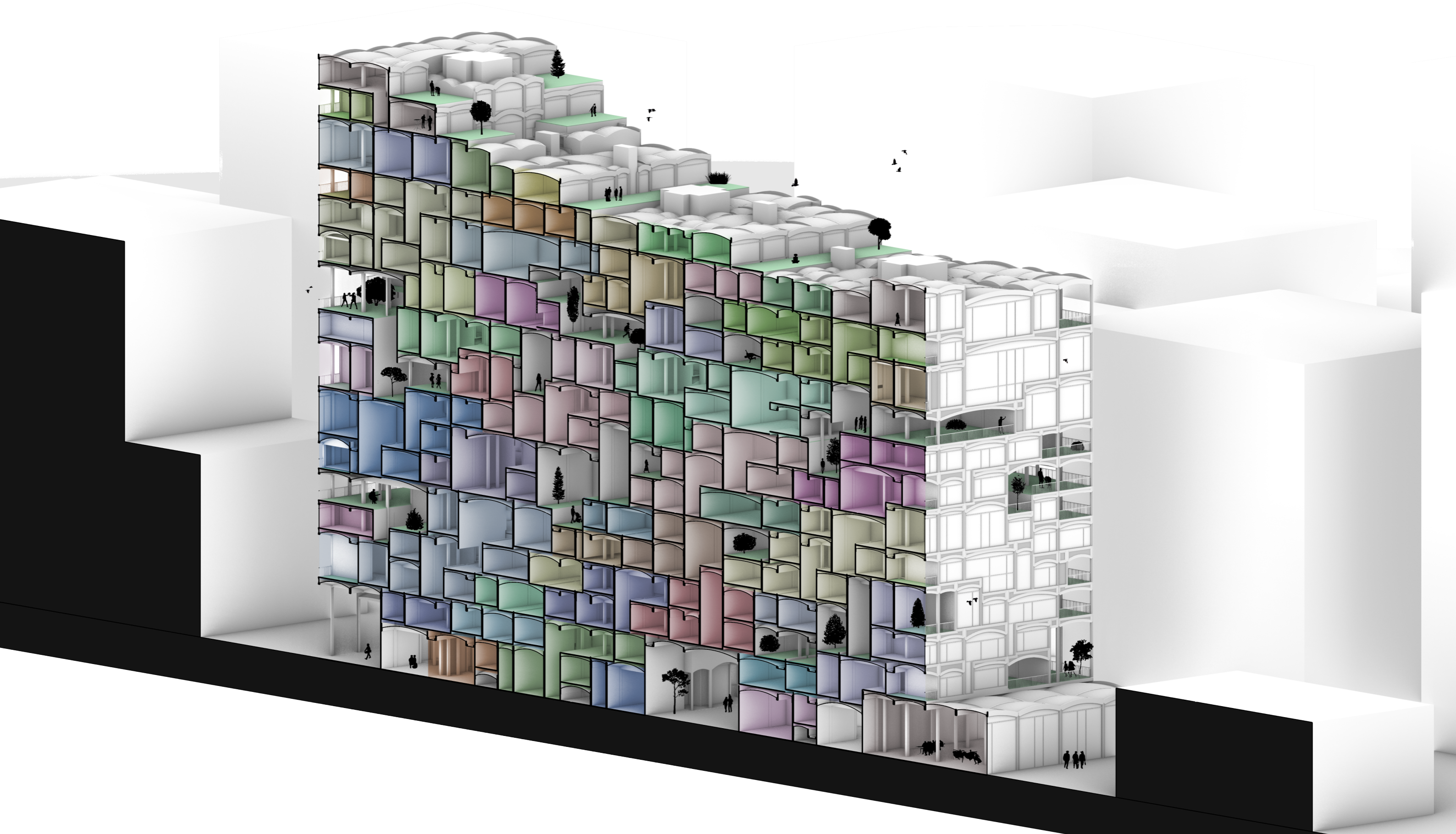


the building consists mostly of housing. the plint and roof are public.



the facade of the building takes on a darker colour in the plint. this shows the difference in function and scale.





concept

-

site

-

large scale

-

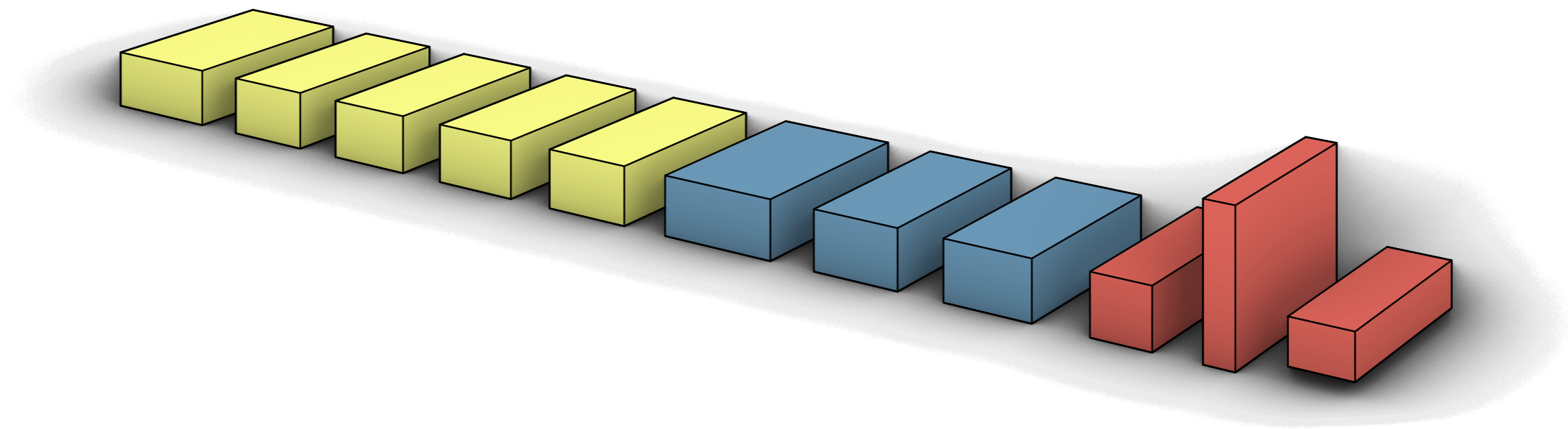
typology puzzle

-

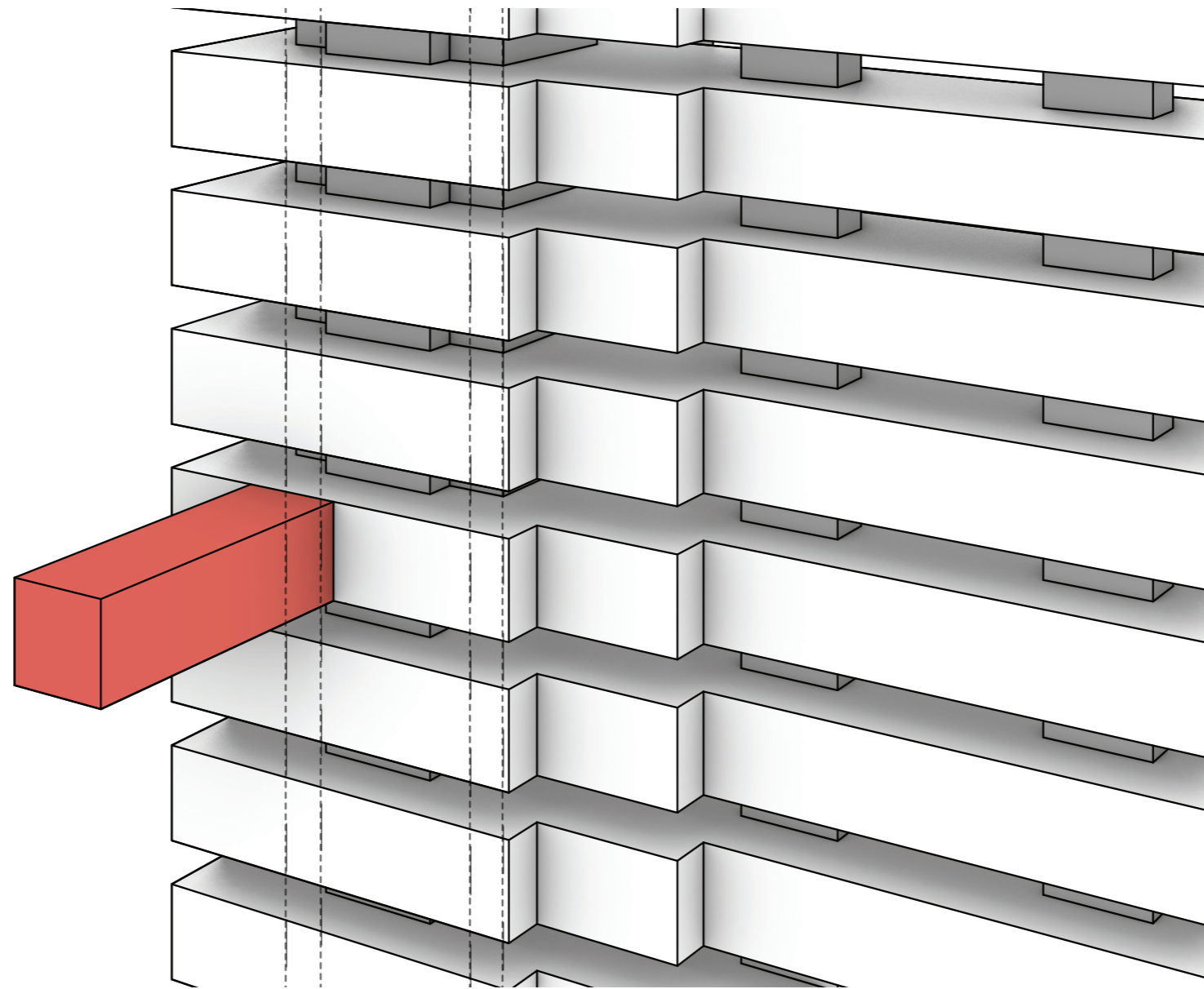
structure

-

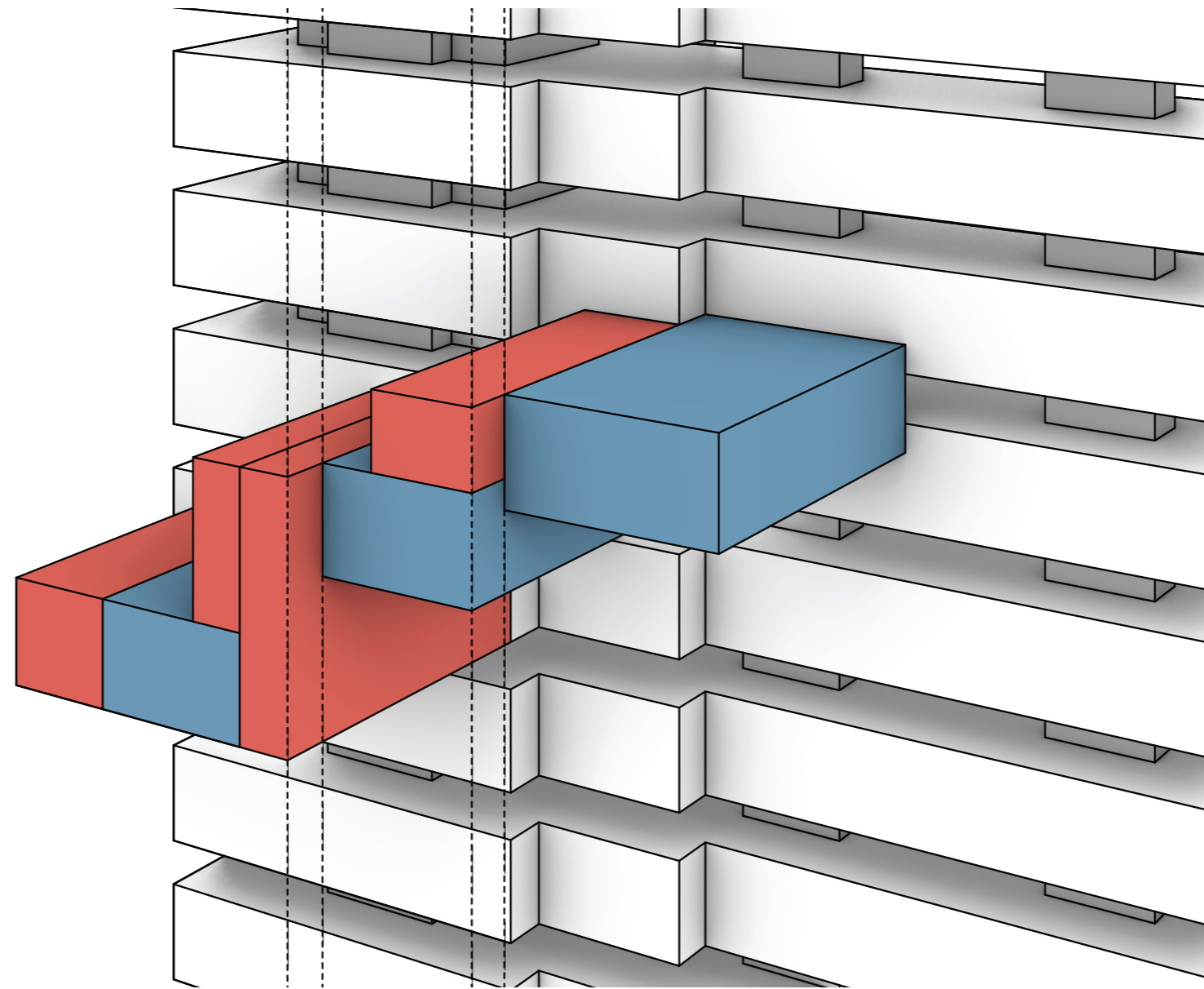
a home



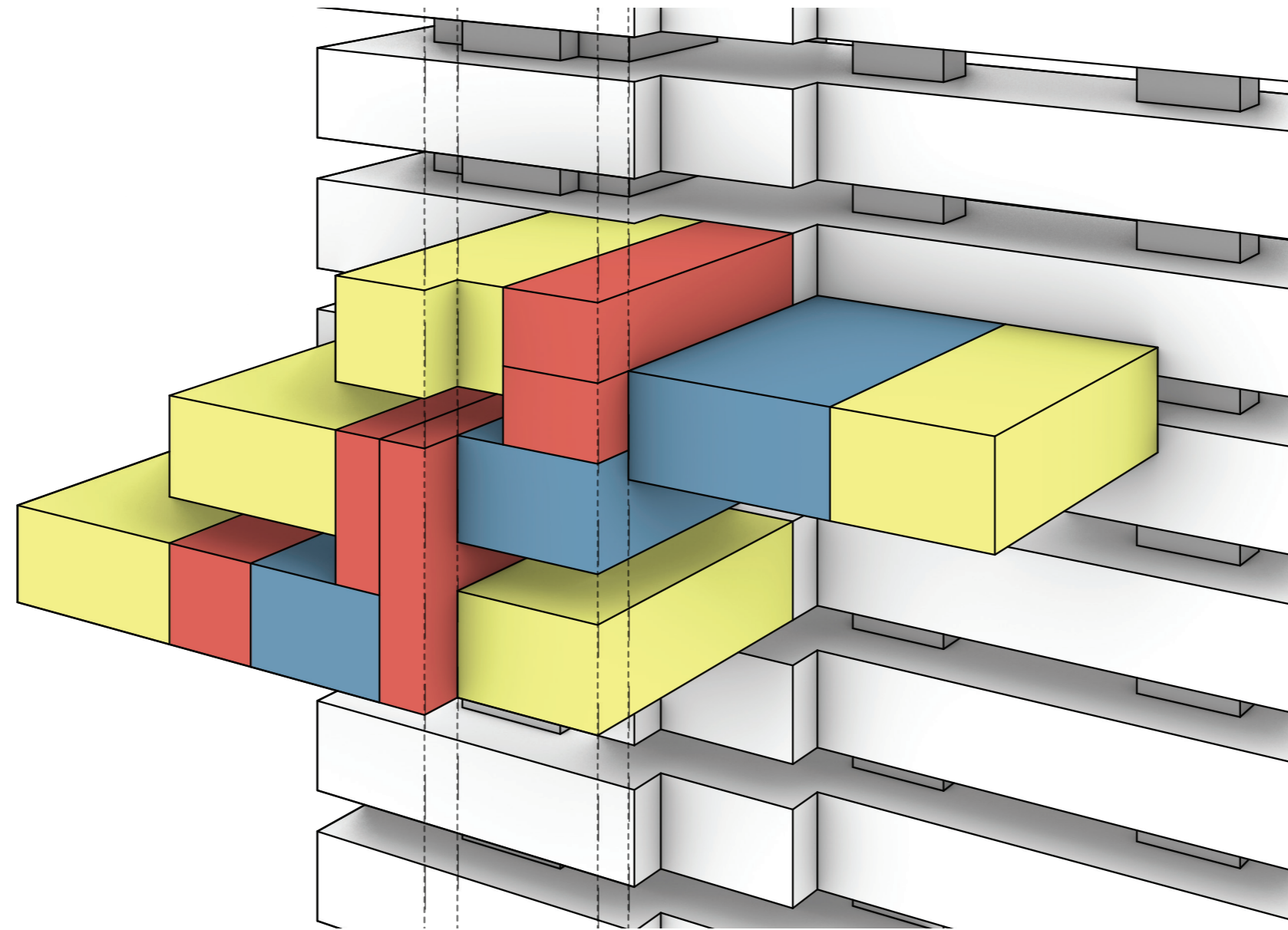
step 0: establish what combination of spaces is needed. start with the largest homes.



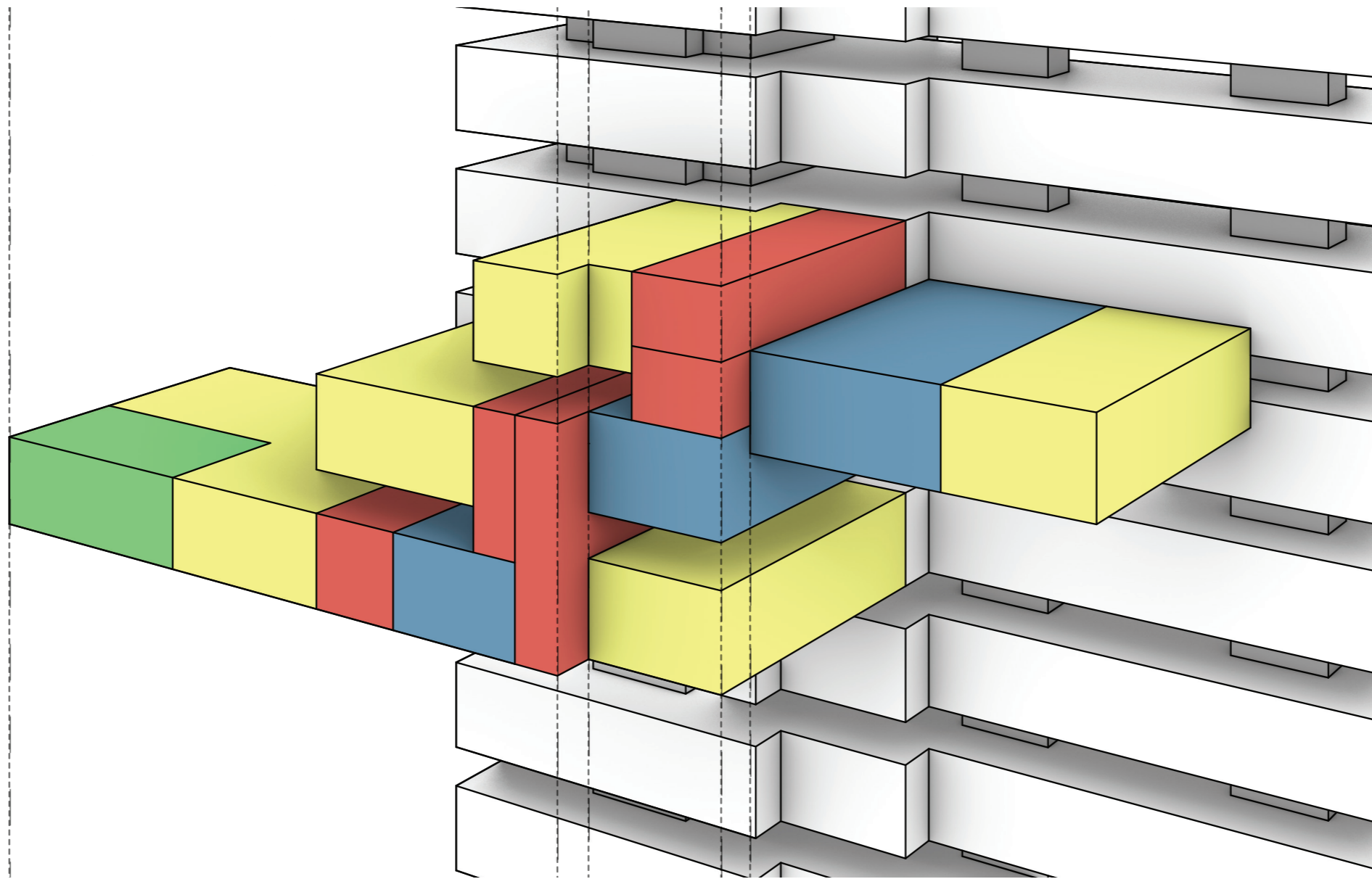
step 1: establish a propagation point (the entrance) from where the home starts growing.



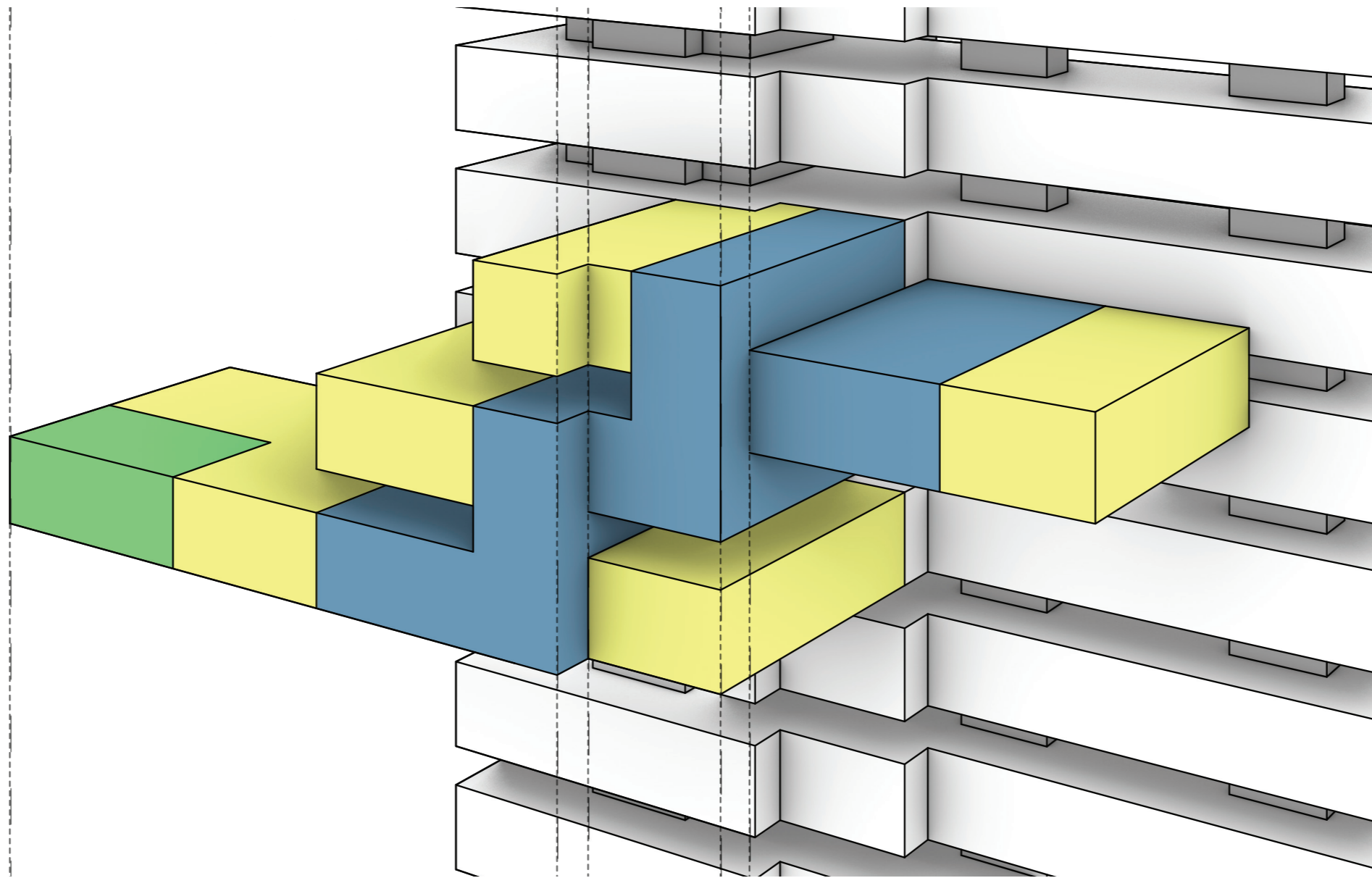
step 2: start adding communal spaces. connecting them with the connecting spaces.



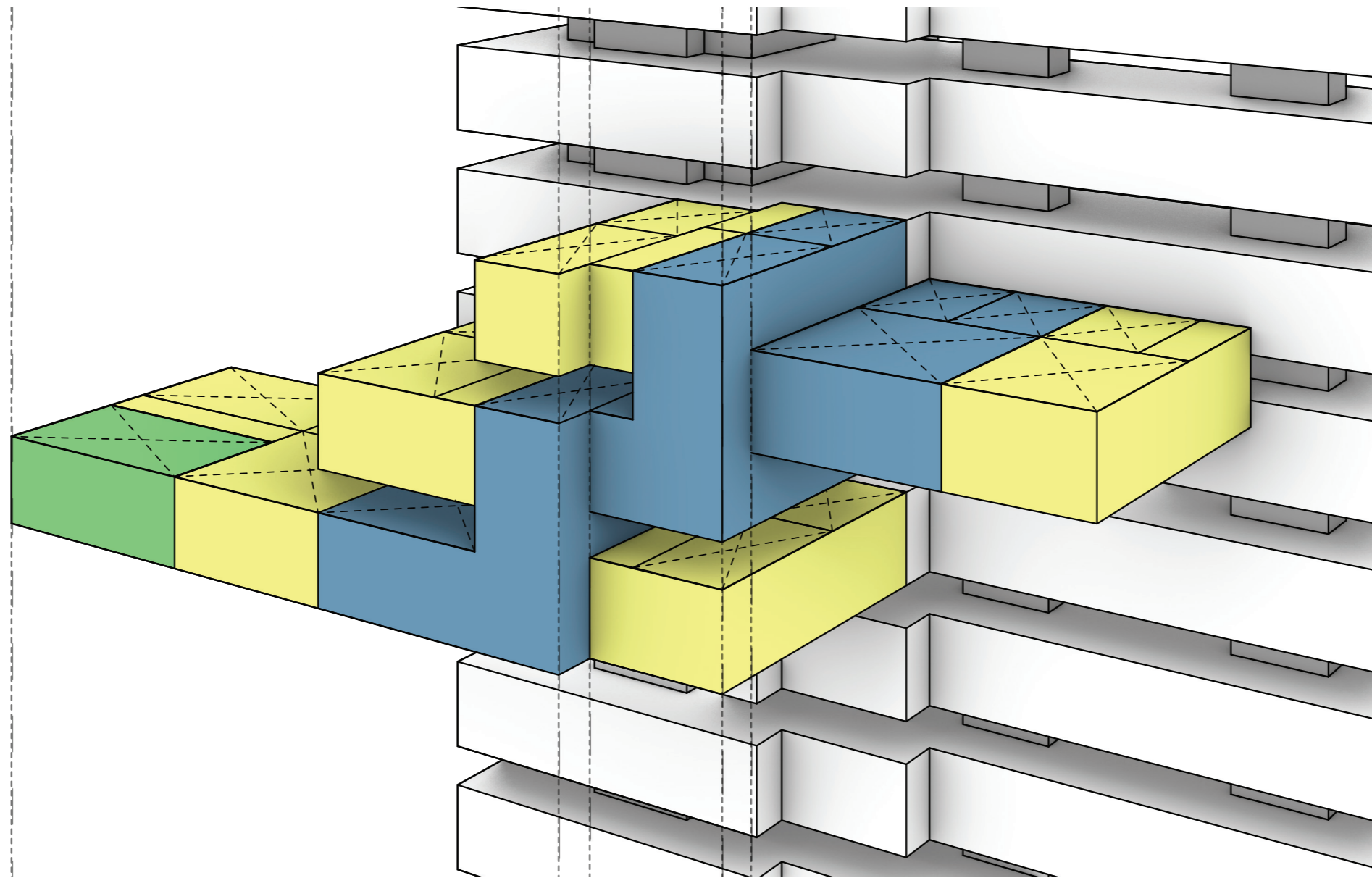
step 3: place private spaces around the communal spaces. add vides where possible.



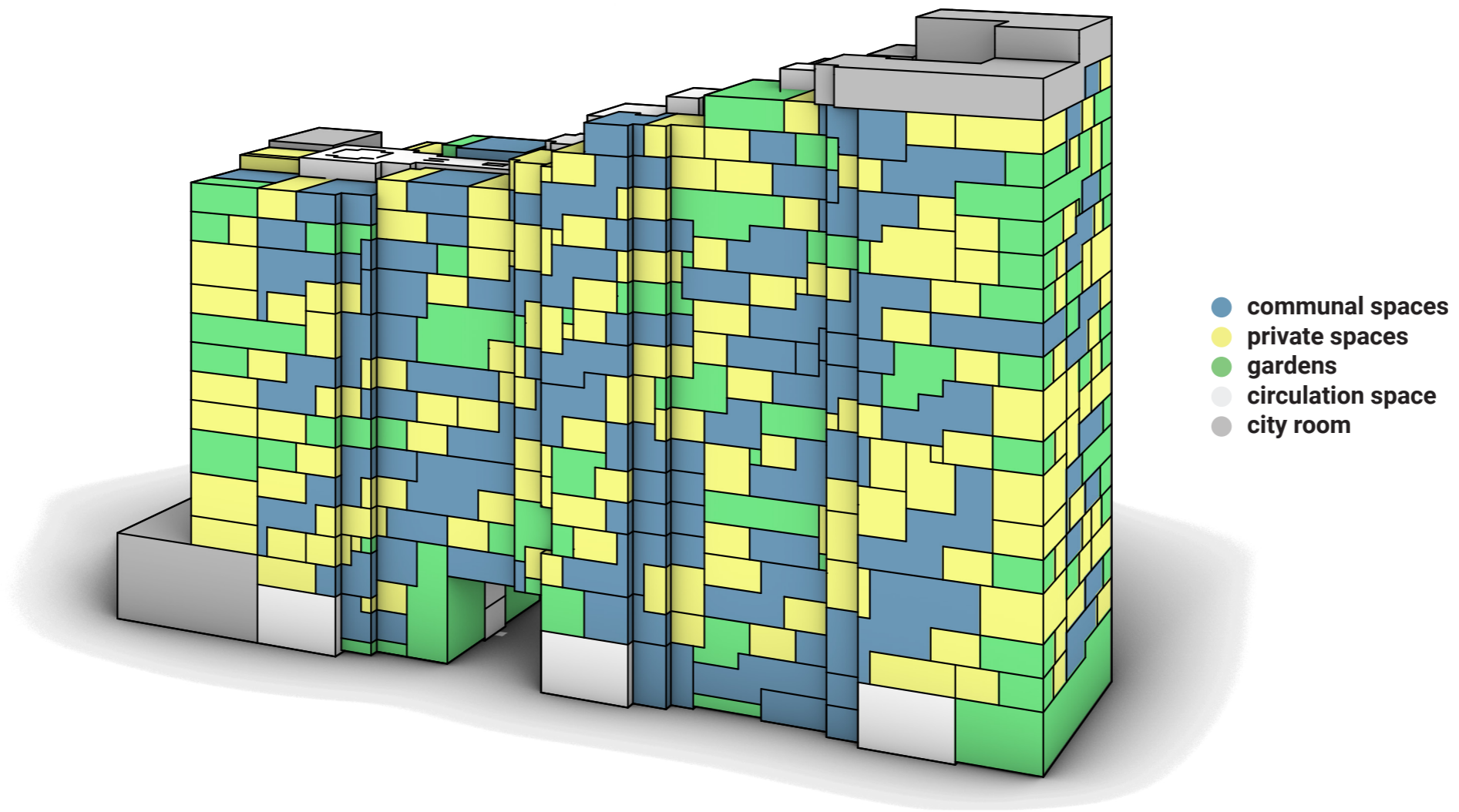
step 4: fill left over space and make gardens where possible.



step 5: combine the public spaces. the basic puzzle piece is done. or not.

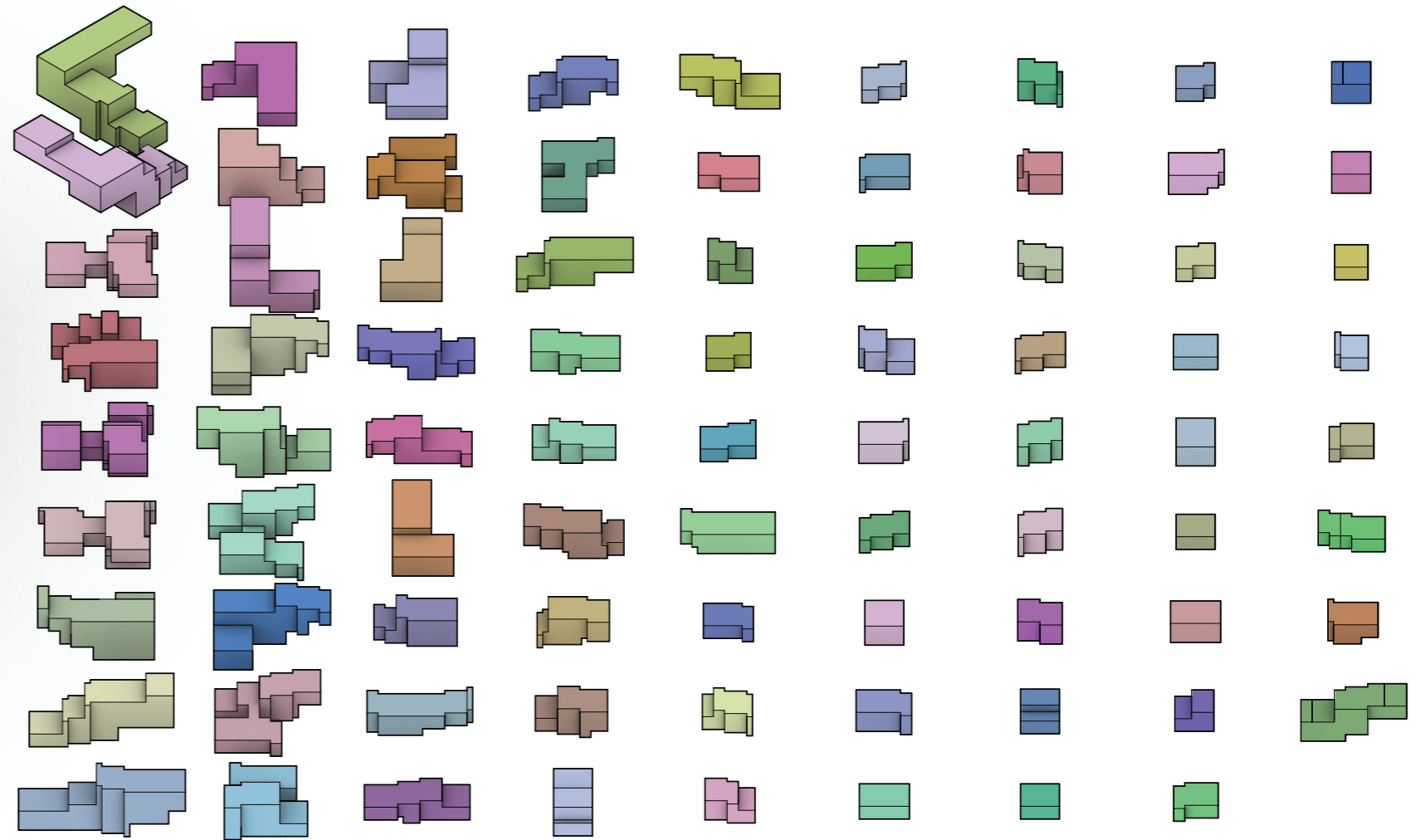
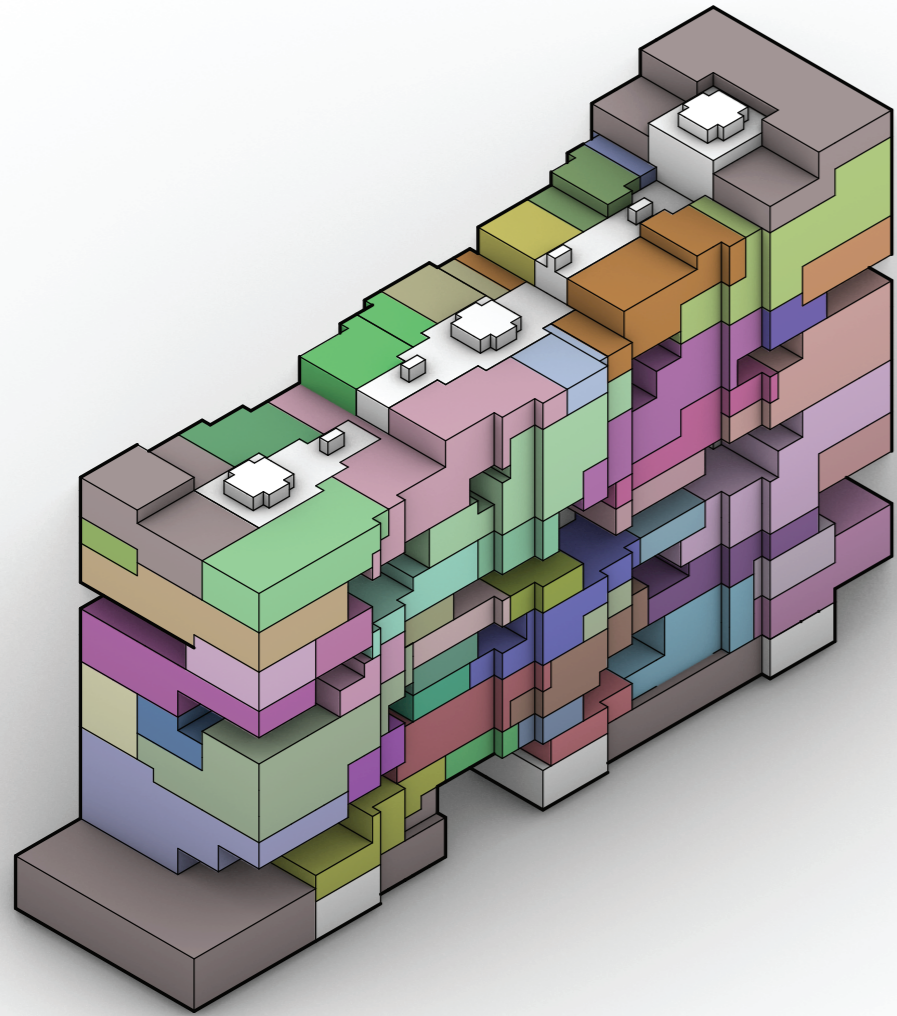


step 6: subdivide spaces into functions (served and servant) and determine vault outline.

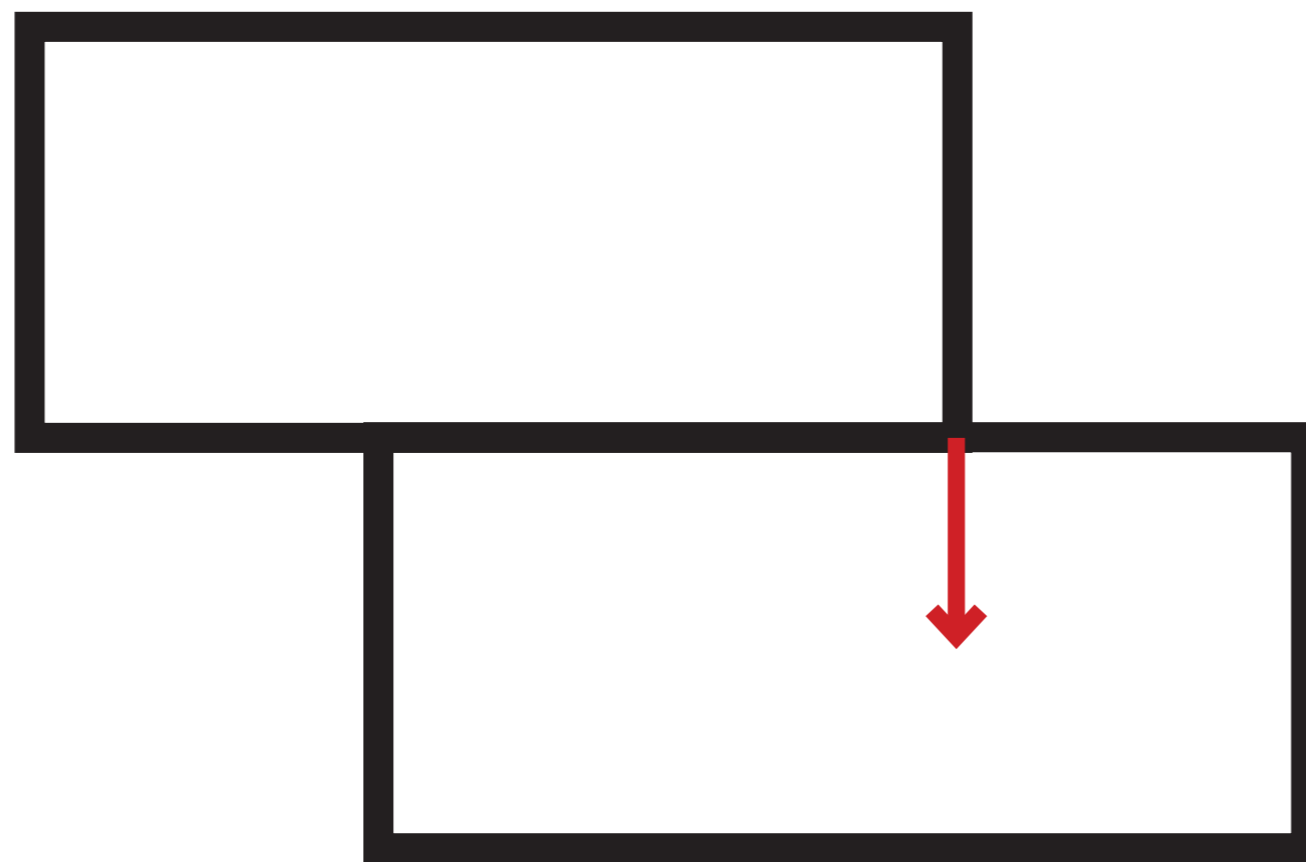


repeat steps until the envelope is filled and manually fix small gaps.

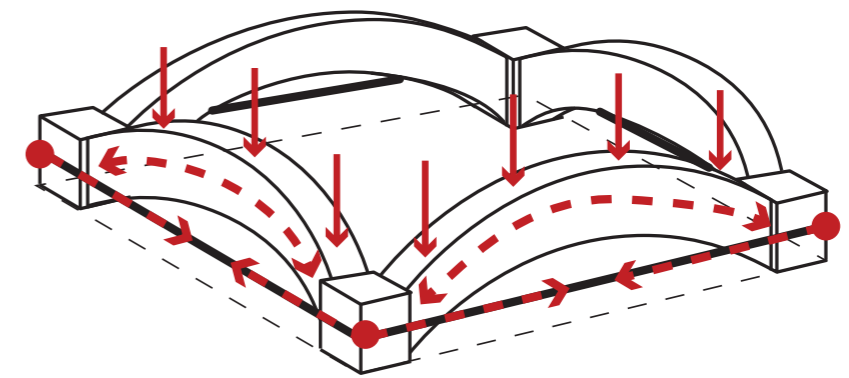
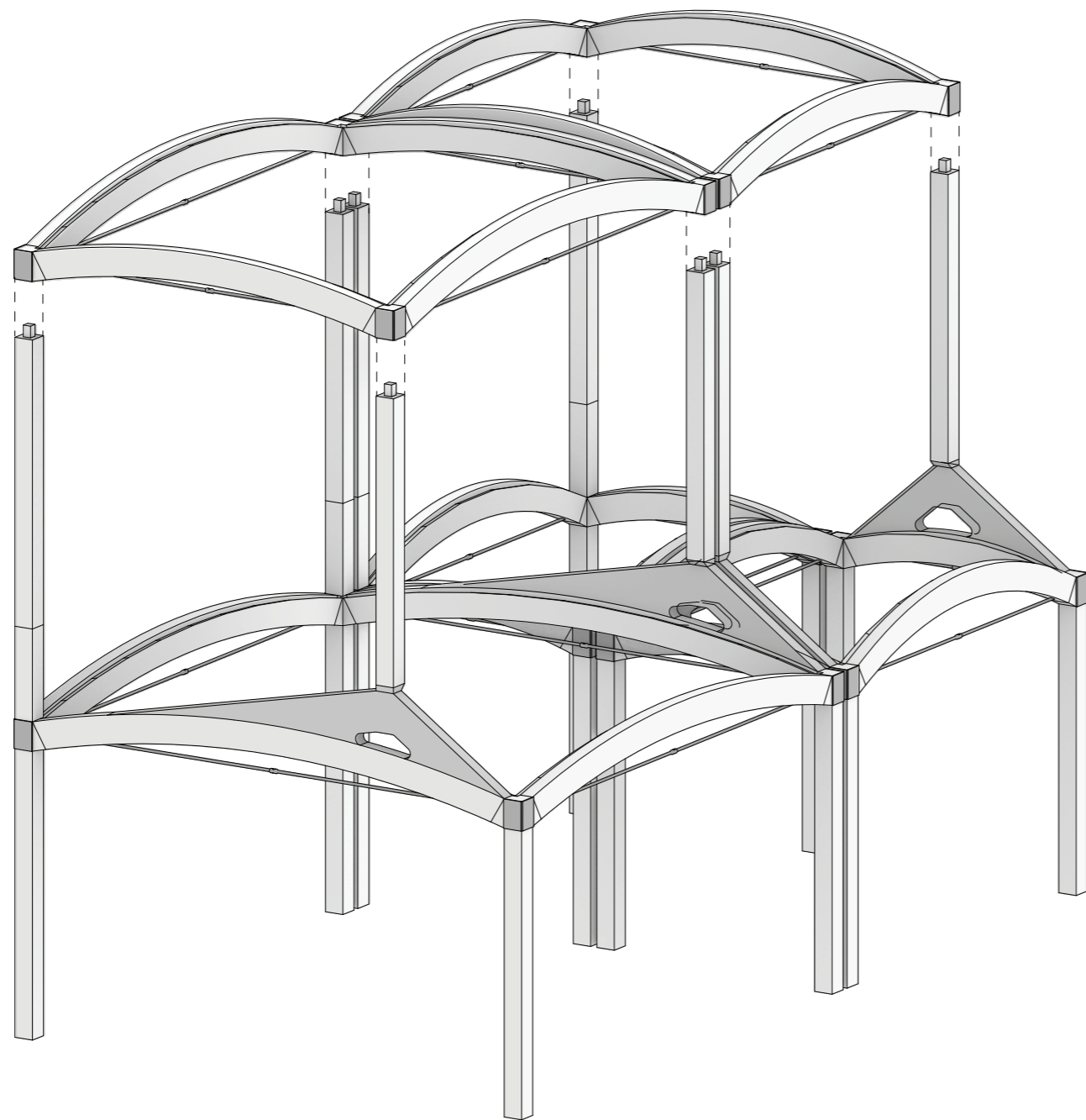
to reflect:



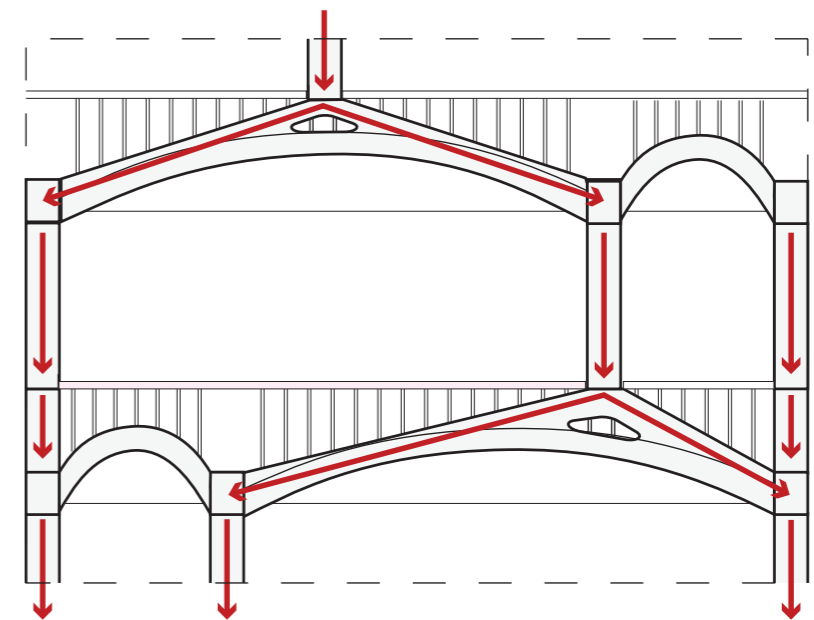
“know the rules well, so you can break them effectively.”



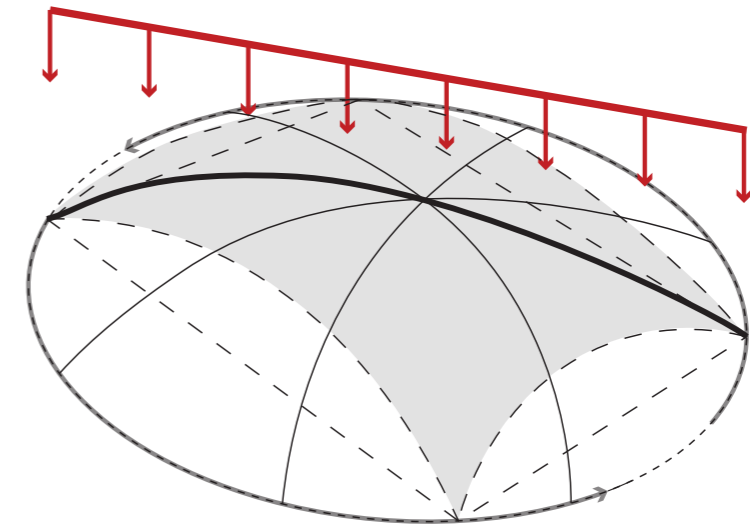
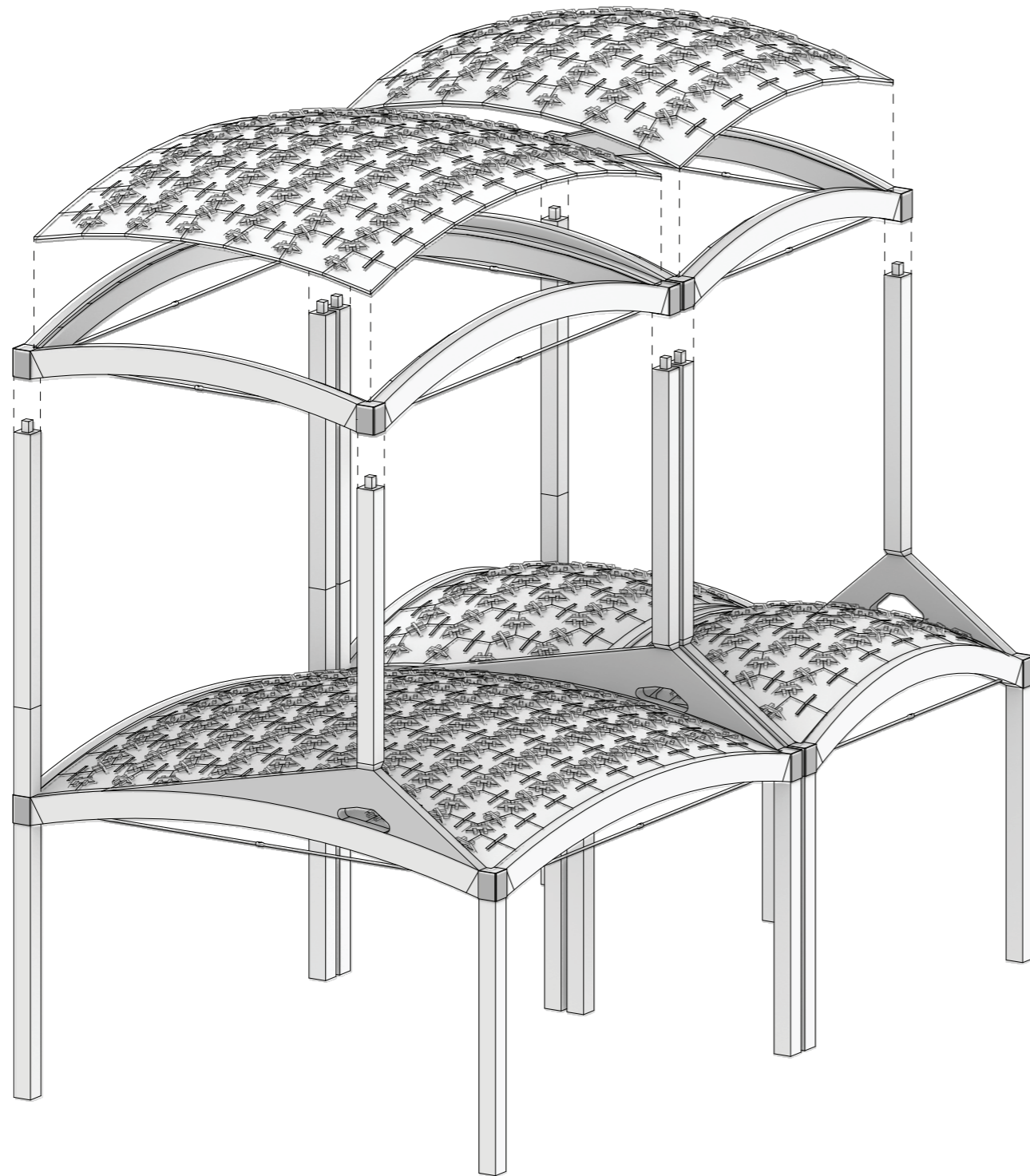
structural challenge of the typology puzzle: misalignment of forces.
is an opportunity to break free of the box.



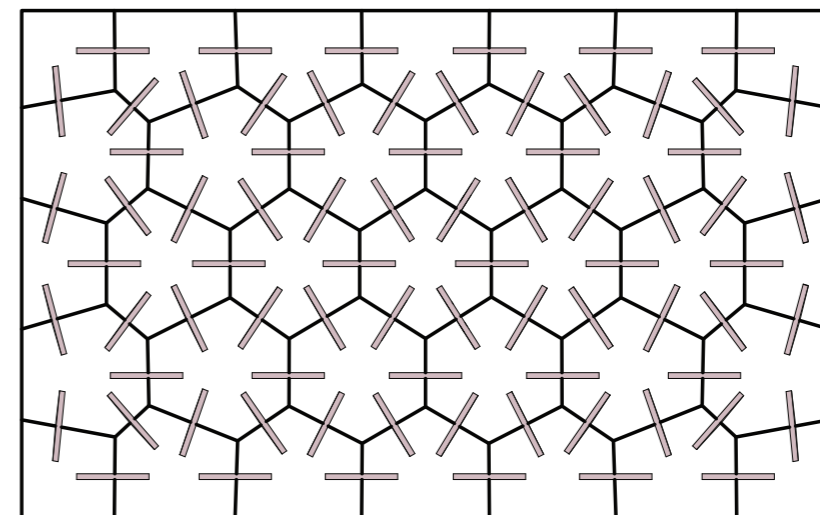
4 arches form a funicular rectangle held together by rods.



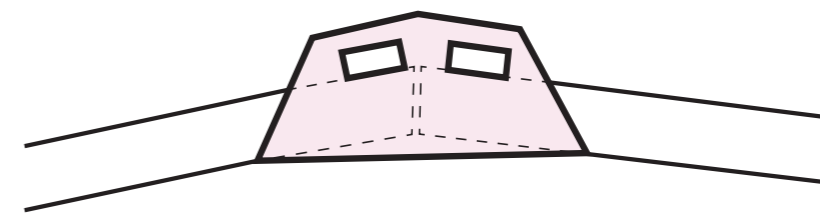
vertical forces from above are handled by the main arch structure. not aligning is solved with a triangle shape.



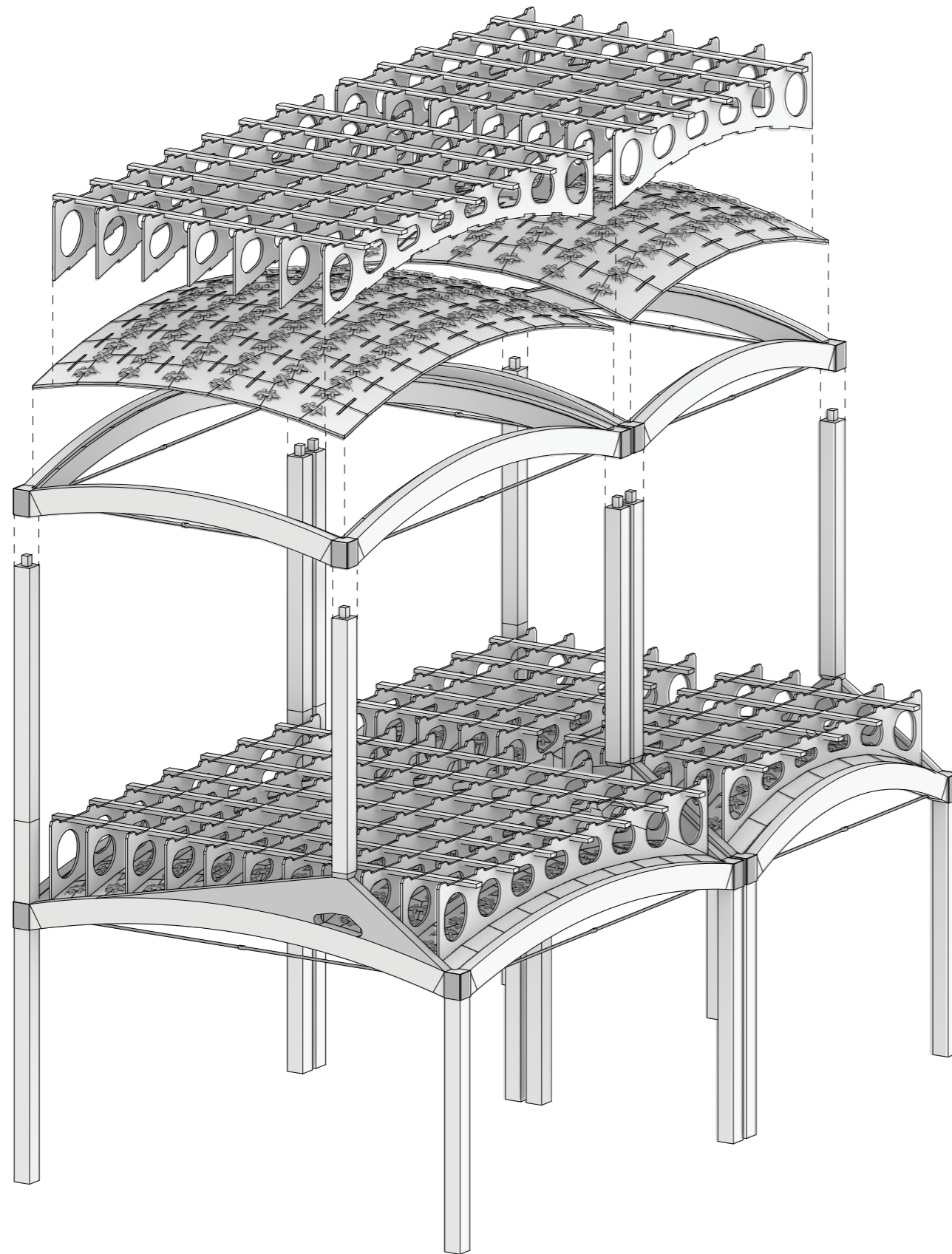
inbetween the arches a funicular surface is added. this surface is a paraboloid



the surface consists of planar hexagonal elements made from multiplex.



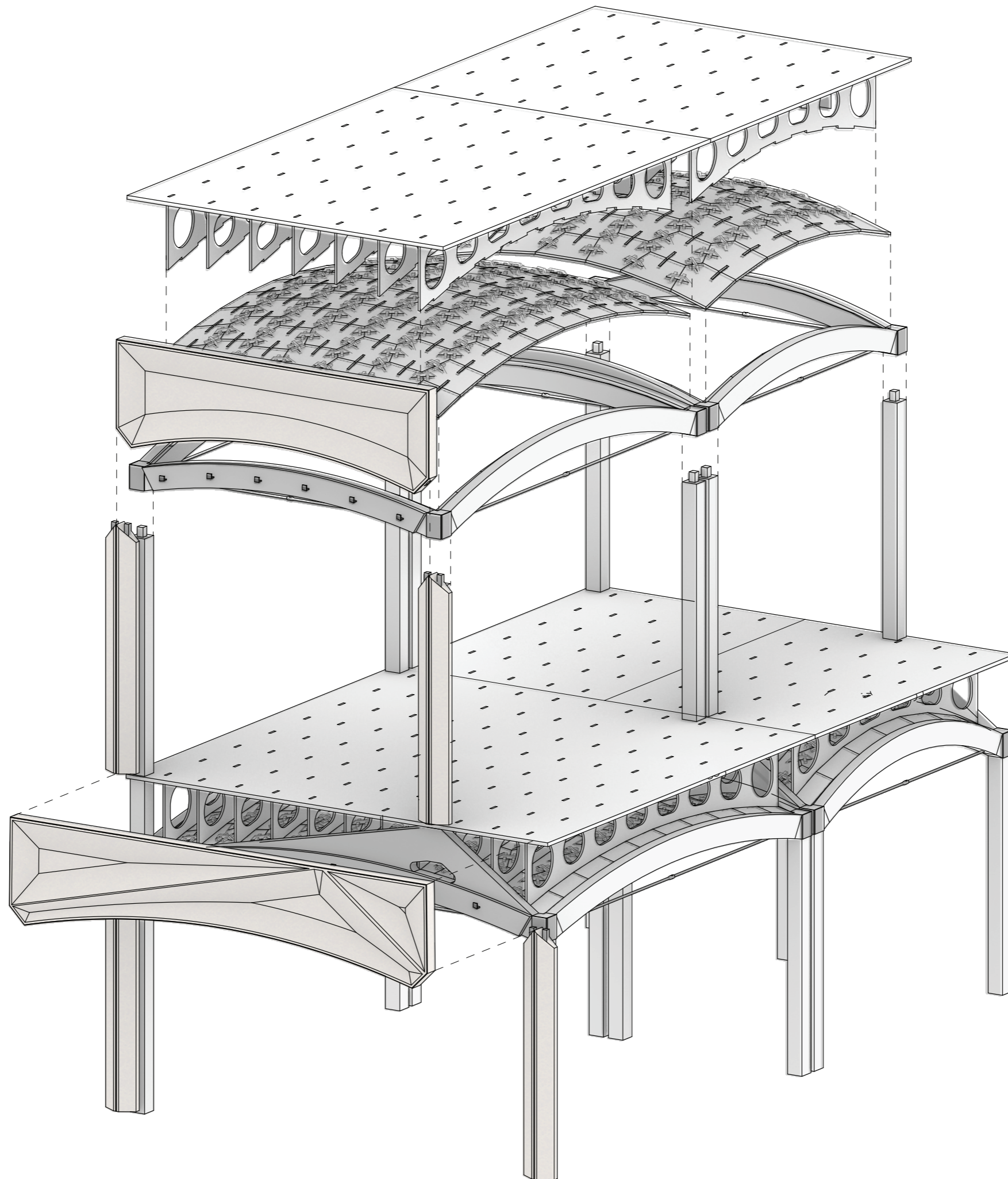
the 'voissiers' are connected using keystone-like dowels.



all parts are planar and can be cut out of a sheet of plywood using CNC-technology.



the spandrels solely transfer the floor load to the load bearing ceiling surface. similar to this reference of a vaulting system in tiles. (Block Research Group, 2016)







concept

-

site

-

large scale

-

typology puzzle

-

structure

-

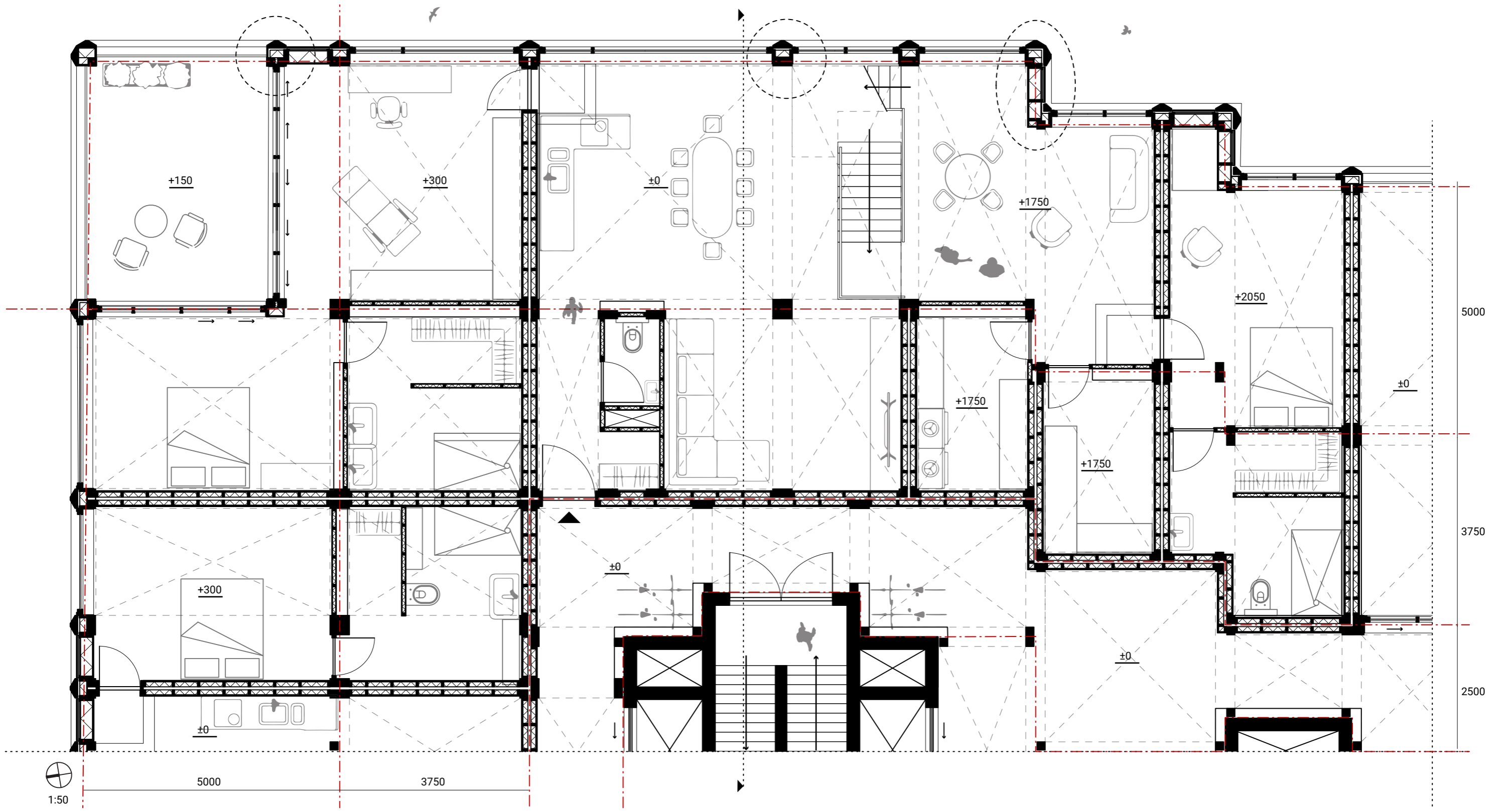
a home

-

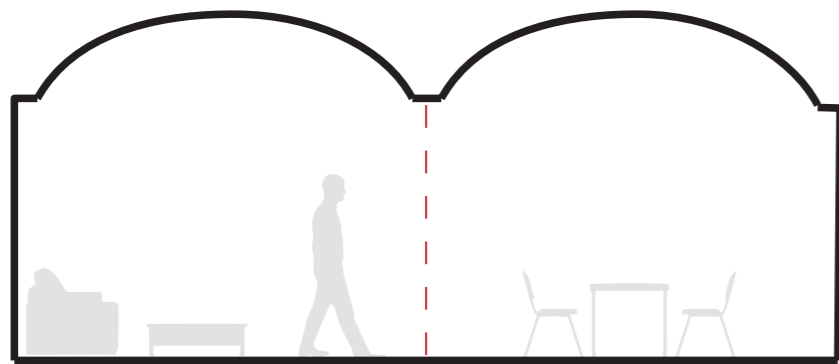
facade

-

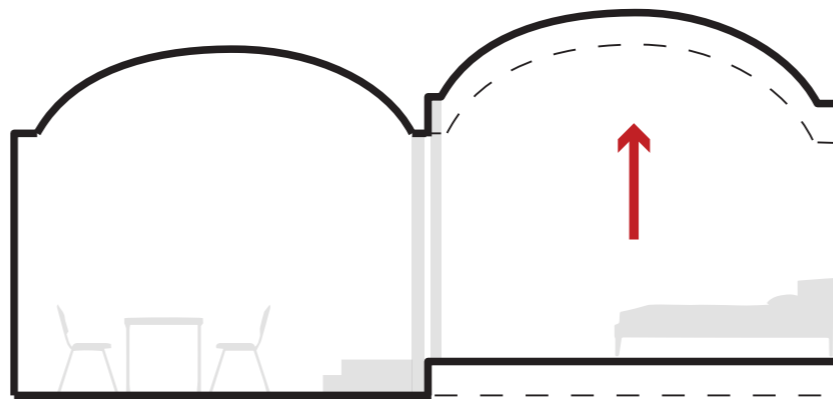
climate



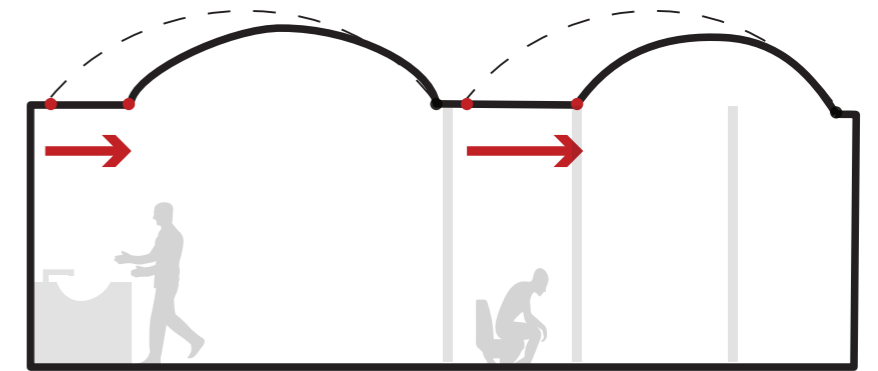




function and structure are connected. The shape of the space helps define it.



spaces are separated not through wasteful hallways but through small height differences and well insulated walls.



walls can be placed in extended 'inbetween' zones or by stopping short of the vault.





concept

-

site

-

large scale

-

typology puzzle

-

structure

-

a home

-

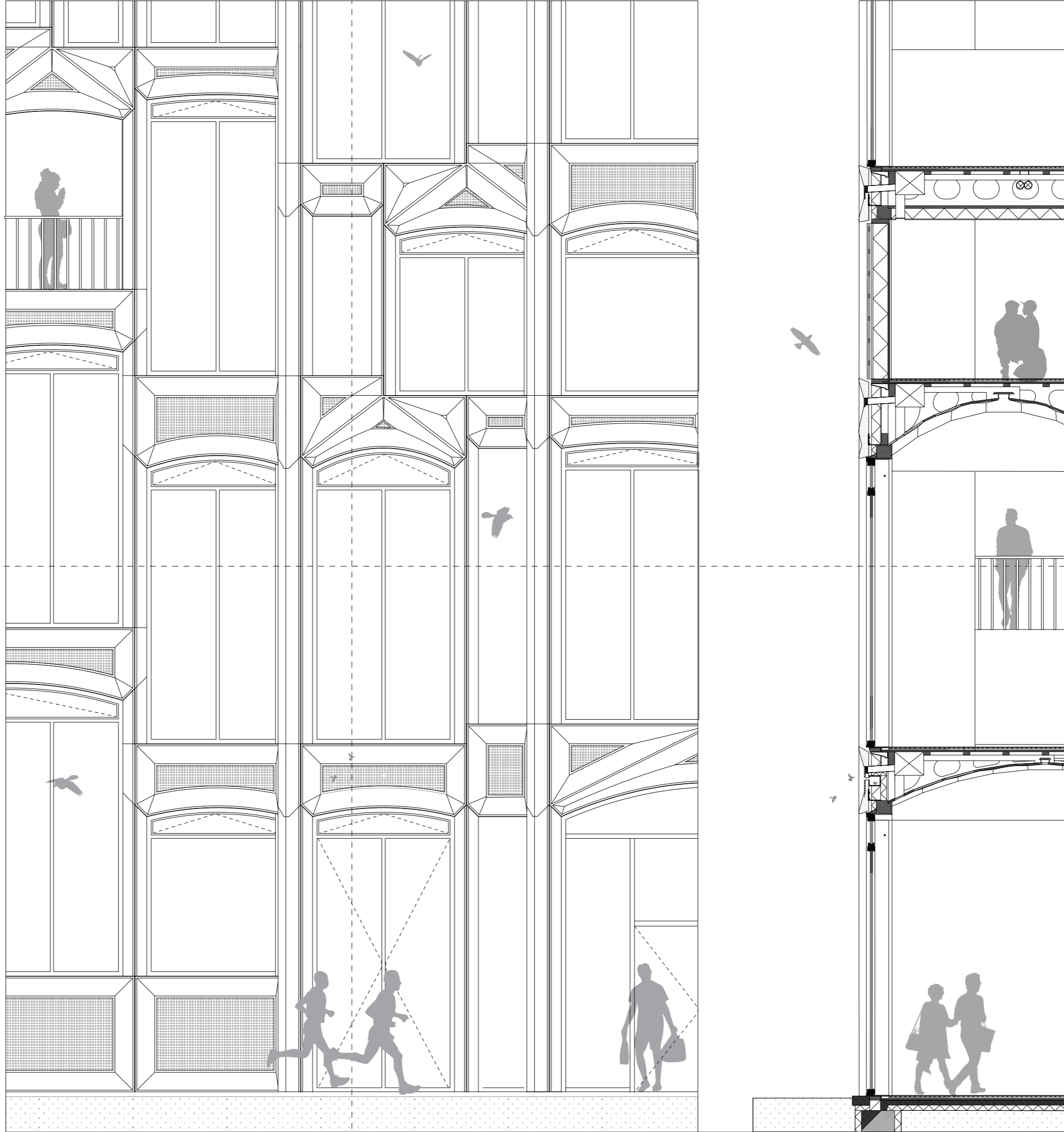
facade

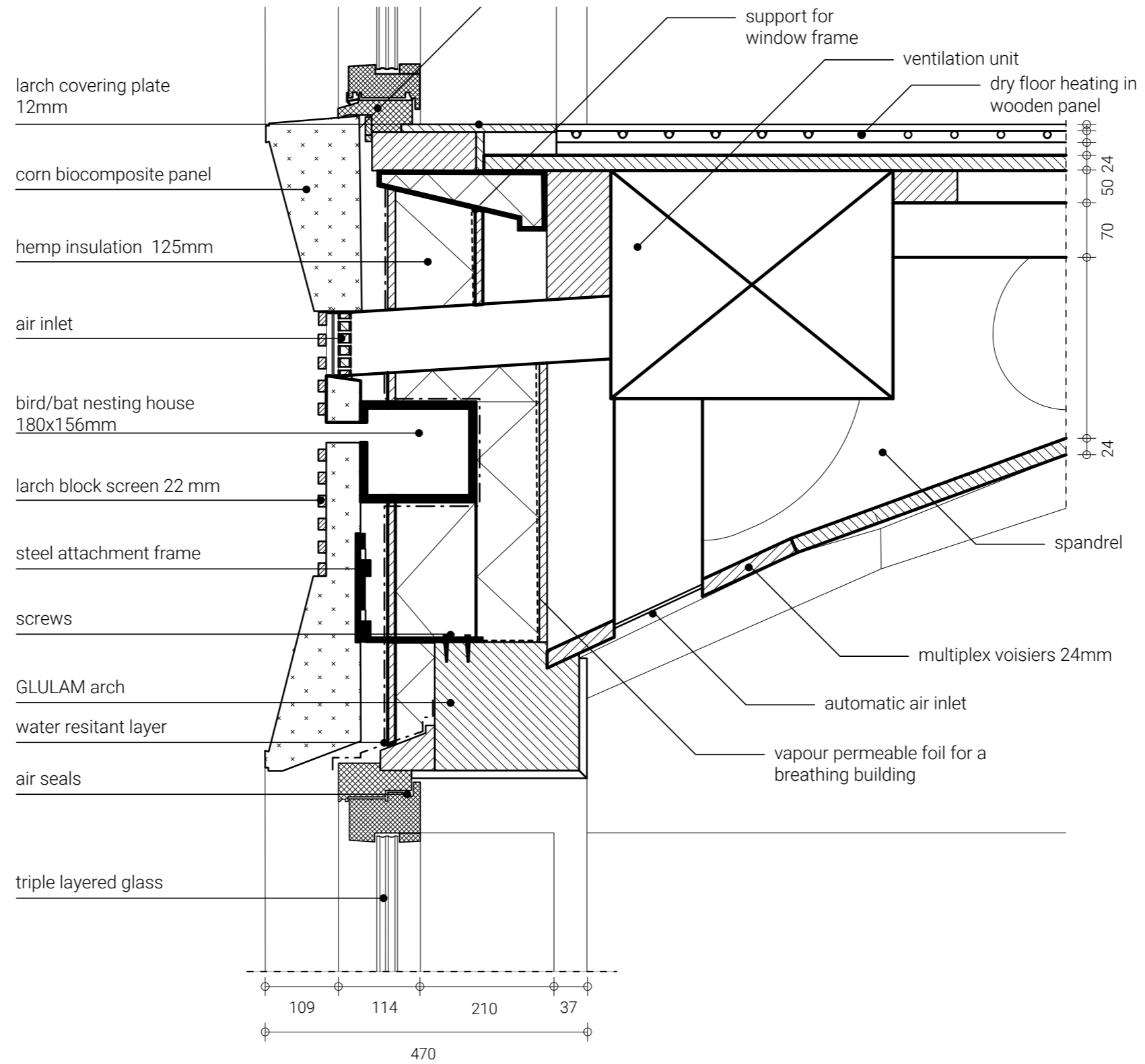
-

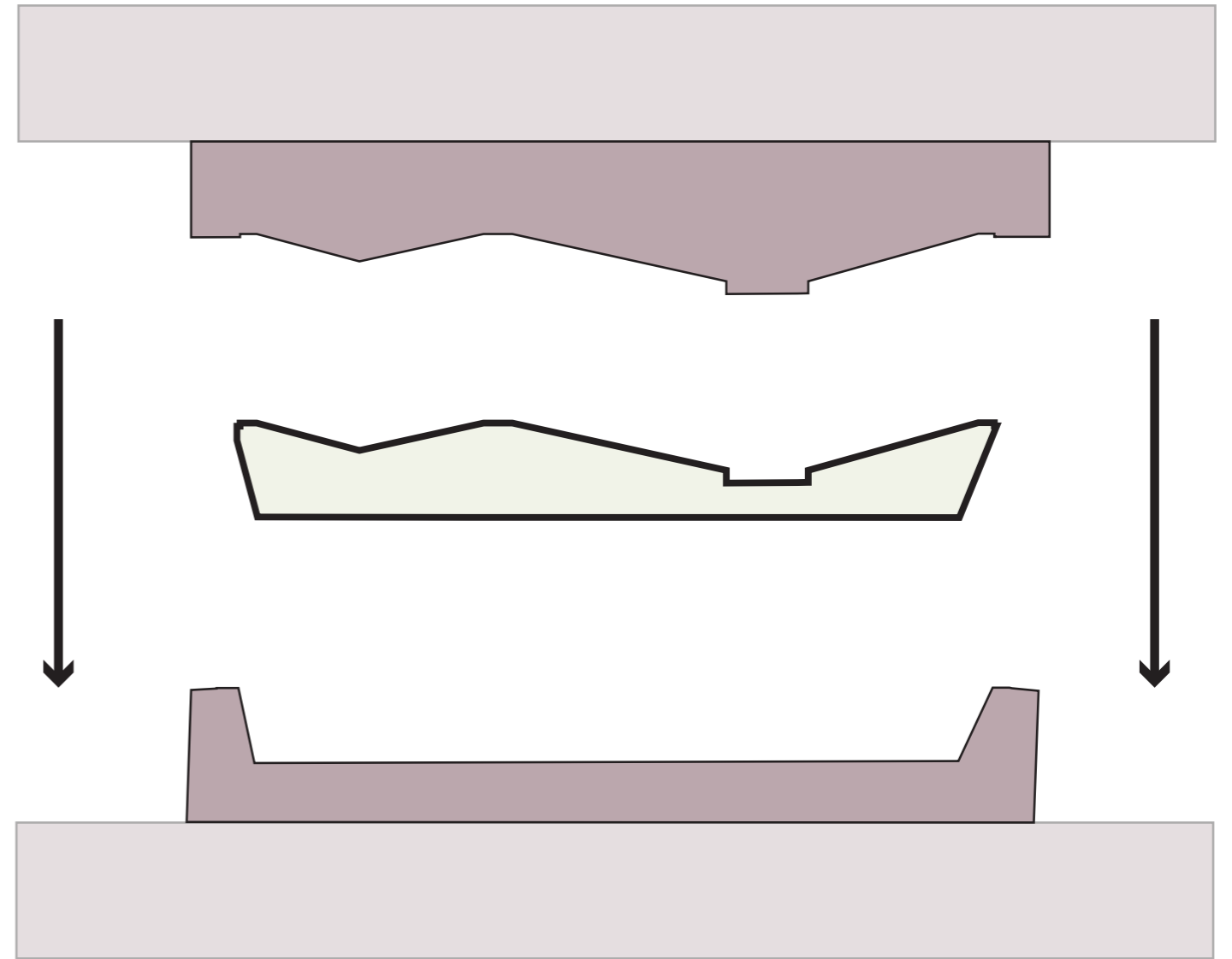
climate



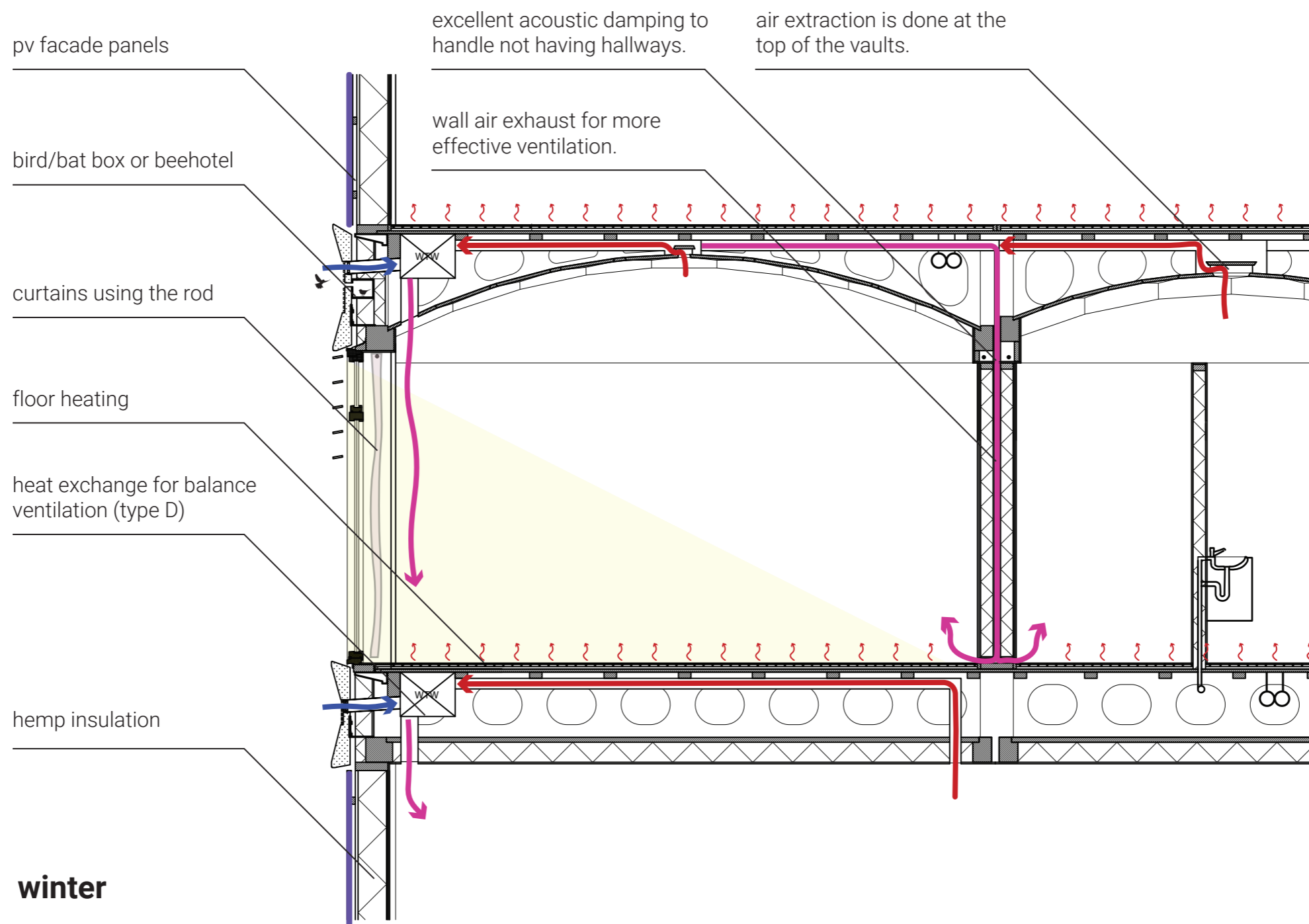


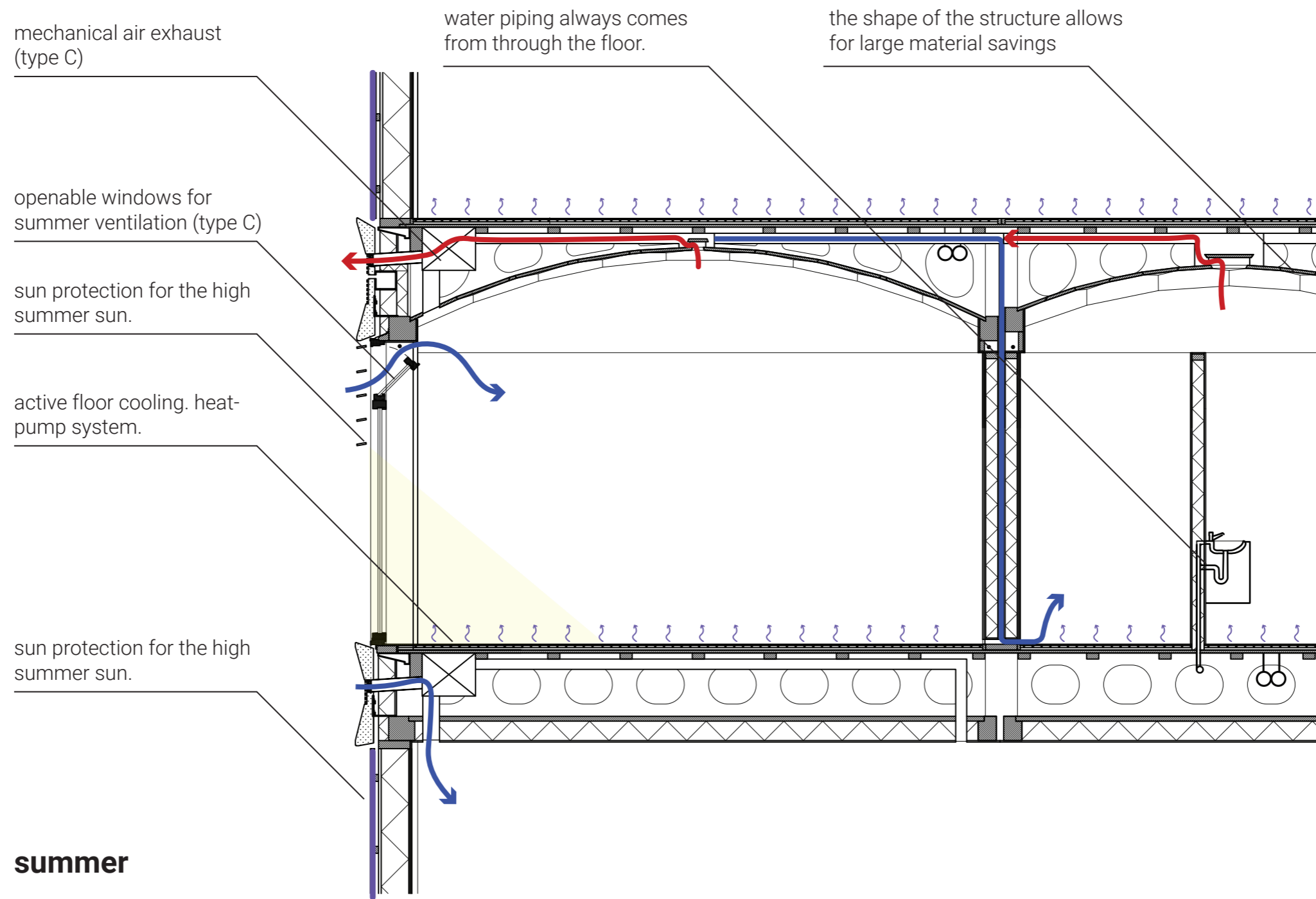


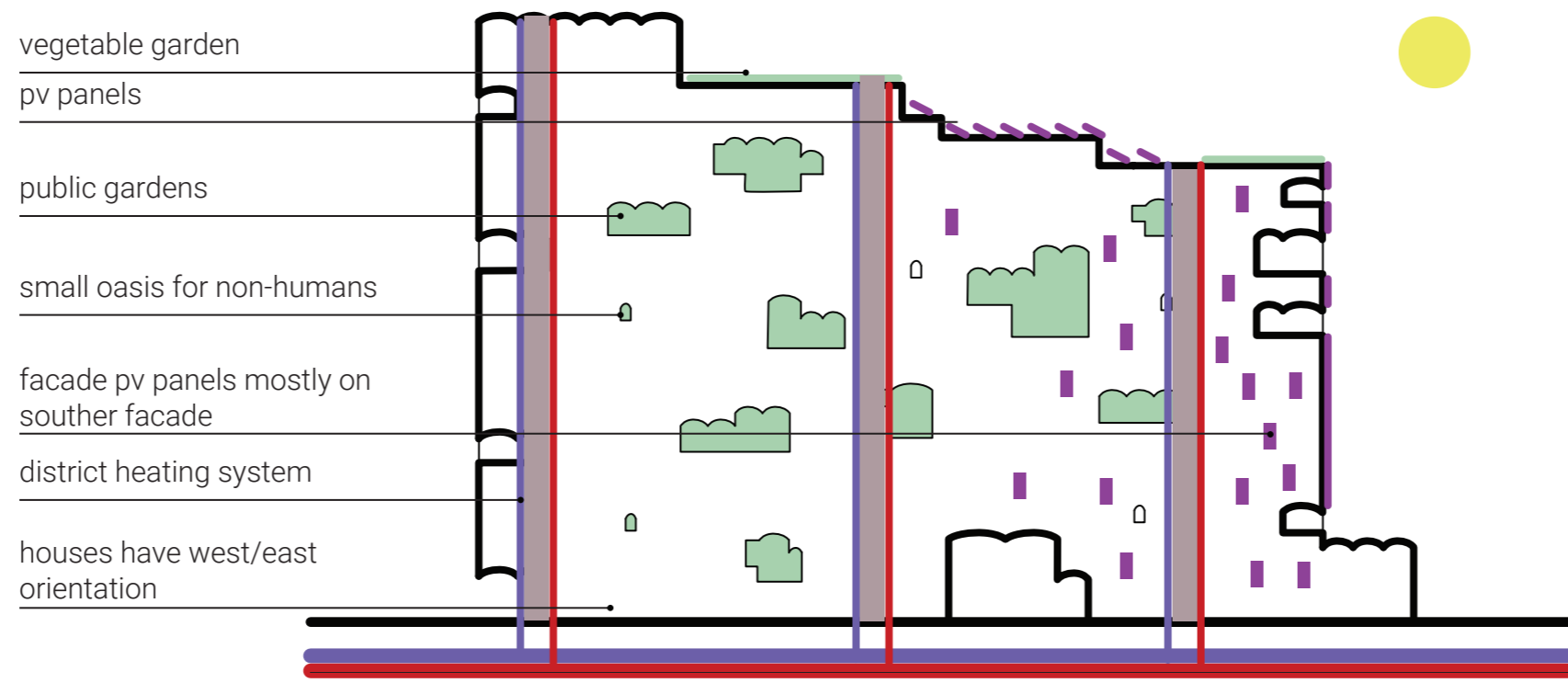


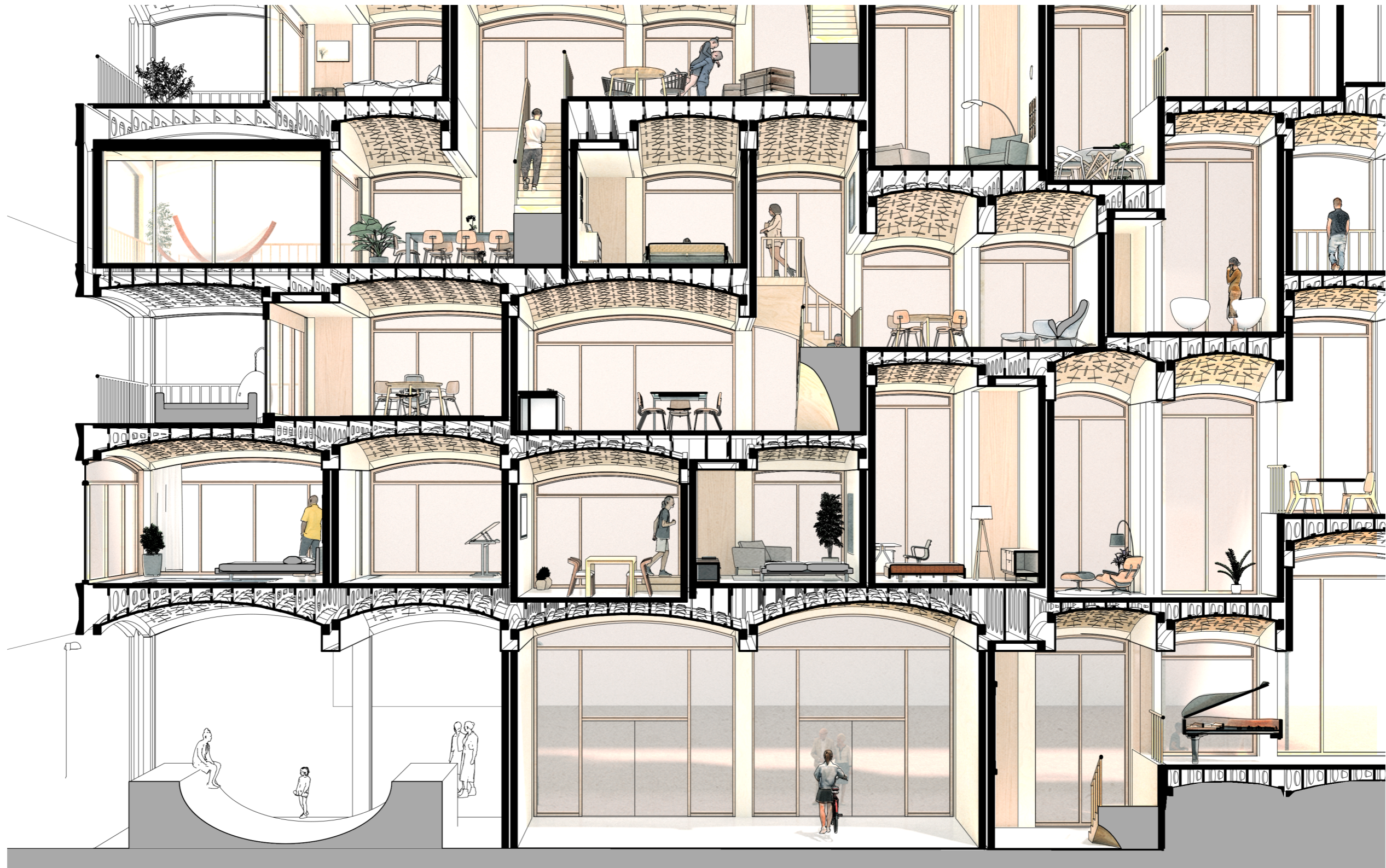


concept - site - large scale - typology puzzle - structure - a home - **facade** - climate



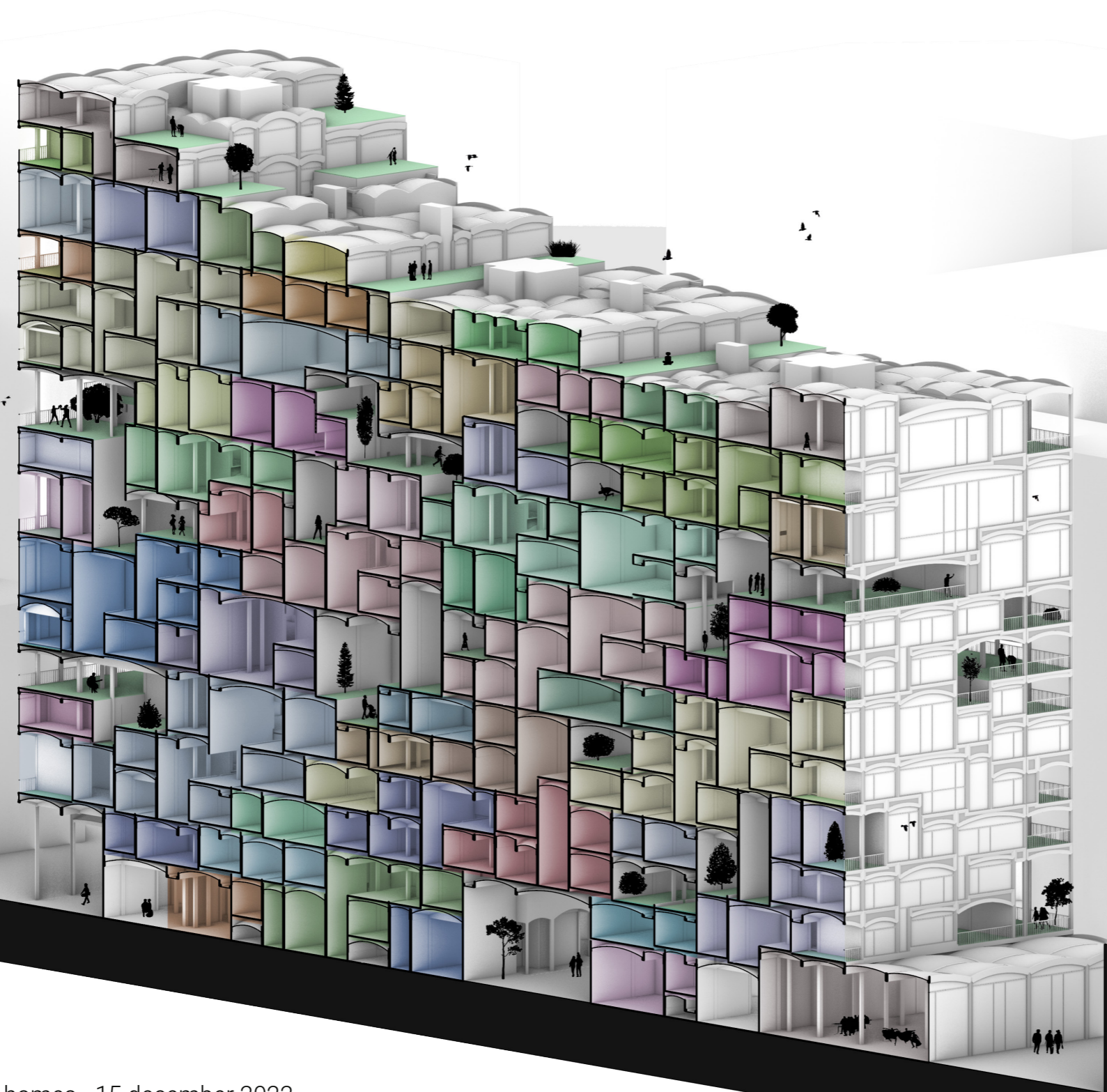








thank you for your attention



berend vos

architectural engineering - 1 million homes - 15 december 2022